THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

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THE IRON AGE

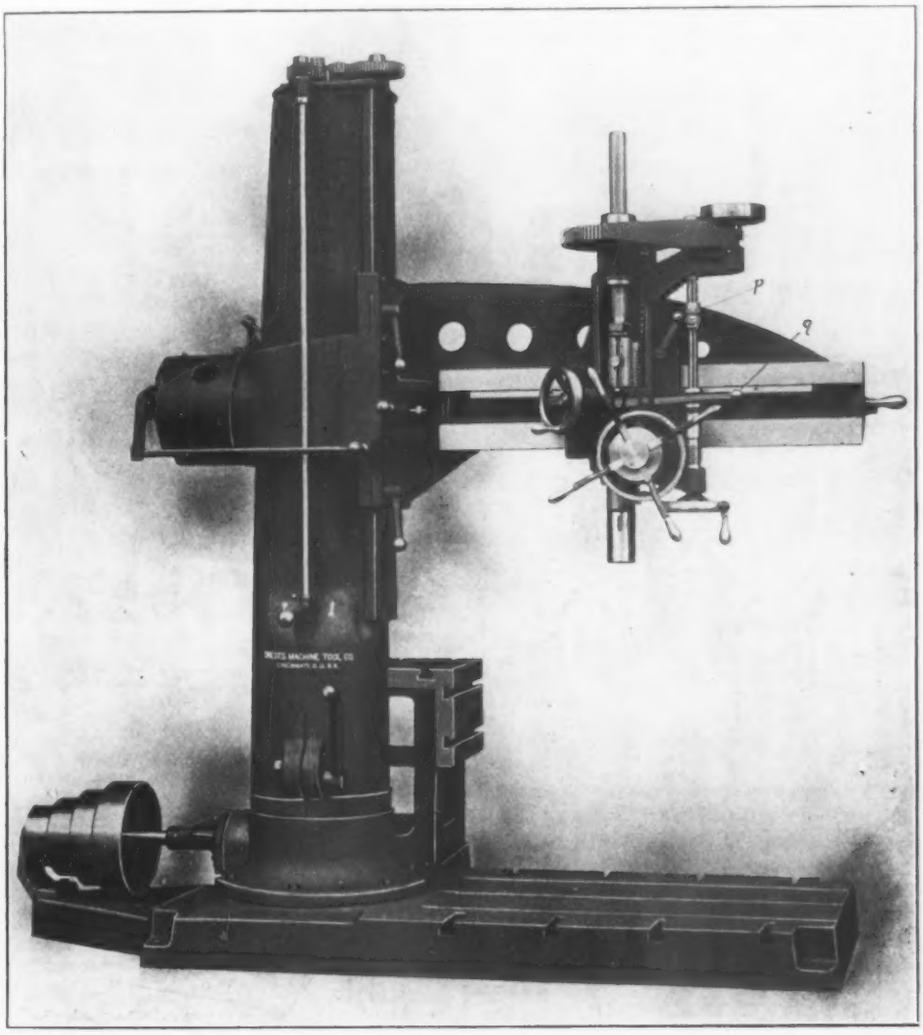
THURSDAY, JUNE 25, 1903.

The Dreses New 48-Inch Radial Drill.

We here illustrate in its principal parts the new 48-inch radial drill built by the Dreses Machine Tool Company of Cincinnati, Ohio. Referring to Figs. 3 and 4, the vertical shaft *a*, which is driven by the lower cone shaft, transmits motion to the short shaft *b*. On this shaft is fixed the pinion *c*, and running loosely on it are the gears *d*, *e*. The double friction clutch *f* is operated by the levers *g*, *g*, and connecting rod *h*, and engages *d* and *e* alternately to the shaft *b*. The gear wheels *i* and *j* run loosely on the shaft *k* and are clutched alternately to the shaft by the double friction clutch *l*, which is operated by the lever *m* by means of the rod *n* working in the hollow shaft *k*. If the wheel *d* is clutched to the shaft *b* the latter transmits motion directly to the shaft *k*, either through the wheel *i* or *j*, whichever is clutched to the shaft. The difference in the size of the gearing increases the speed of what is ordinarily called back gearing. With the wheels *e* and *j* runs an idler, *o*, which, however, does not come in contact with wheel *b*, which is made smaller in diameter for this purpose. To reverse the motion of the shaft *k* and consequently the drill spindle, the clutch *f* is engaged with the gear wheel *e*, and the motion of the shaft *k* is transmitted indirectly through the idler *o* and wheel *j*. The difference in the forward and backward speed is equal to the proportion of the gears *e*, *i* and *e*, *j*, which is about 5 to 1. If a small difference for light tapping is wanted the clutch *l* is engaged with *j*, and the clutch *f* engaged with the gear *d* for forward motion and with the gear *e* for backing out. The difference here is equal only to the difference in gears *g* and *d*. The brake power of the clutch *l* in the gear *i* can be regulated by the knurled nut *s* on the stud *r*, which protrudes through the lever *m*, so that in case the tap strikes the bottom of the hole or any other obstruction the spindle will stop.

The double friction clutches consist of a double taper cone encircled by two split rings straight on the outside and fitting into suitable recesses in the gear wheels. This makes the brake surface straight and avoids wearing of grooves, which very often happens to taper clutches. The rings on the cones are held in place by a key, so that there is only a sliding friction in expanding them.

The feed of the spindle is semigeared and the four changes are made by shifting the knob *p* on the worm rod. The quick return has four levers, either of which engages or disengages the feed instantly and is kept disengaged by the automatic locking plug when used for tapping. The head is moved on the arm by the well-known rack and spiral pinion. The hand wheel is put on the left hand side of the head, so that the operator, having his left hand on this wheel and his right hand on the



THE DRESES NEW 48-INCH RADIAL DRILL.

handle on the end of the arm, can perform a compound movement to find the center of the next hole. The feed is engaged and disengaged by tapping the knob q up or down and a depth gauge and automatic stop predetermines the depth of the holes being drilled. The column rests on an antifriction bearing, consisting of rollers alternately large and a little smaller in diameter to prevent friction between them. In arresting the swinging movement of the column and arm the common practice of clamping the two surfaces between the antifriction rollers or balls, and so injuring the track, is avoided by clutching the outer shell of column and the inner cylindrical part together.

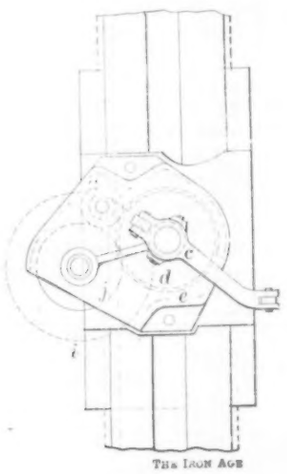


Fig. 2.—Elevation.

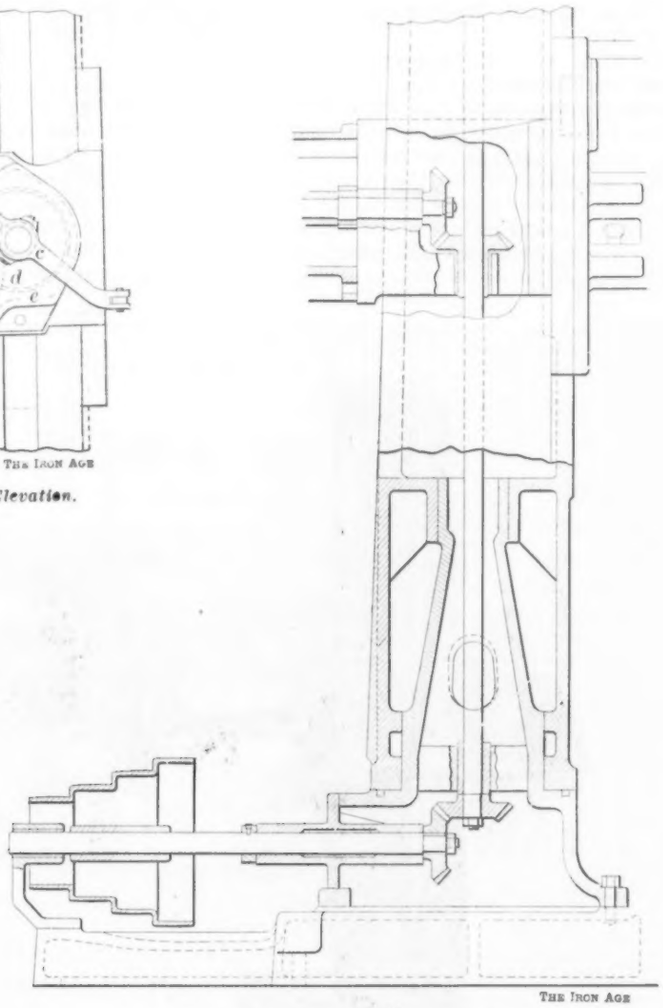


Fig. 3.—Sectional Elevation.

Definition of "Fomented Swarth."

The attention of our readers has doubtless been directed to the use of the words "fomented swarth" as applied to certain materials used in the process of puddling or boiling in rolling mills. The term is found in the scale of wages adopted by the Amalgamated Association of Iron, Steel and Tin Workers, as published in our columns on June 4. Believing that the trade would be interested in a correct definition of this term, we have secured from James H. Nutt of the Republic Iron & Steel Company, Youngstown, Ohio, the following explanation of the words thus used. Mr. Nutt says: "Clause No. 12 in the boiling scale reads: 'Fifty cents per ton extra for all metal boiled, also for fomented swarth or turnings worked on clay or hot cinder fix.' Swarth as here used is a technical term applied in the mill to cast iron borings and turnings. Cast turnings are the refuse or turnings from iron castings. In the trade this material is known as cast borings and turnings, but in the mill it is always called swarth. This material is usually worked up in a boiling or puddling furnace. The lining of the furnace is ordinarily made from fix ore, and in such cases the boiling is paid for at the straight price named for boiling. In some cases the lining for the furnace is made from fire clay, which has to be renewed frequently, and therefore the men ask 50 cents extra per ton. Sometimes this material is thrown into a furnace, and as it becomes heated it is rolled around the furnace until a ball is secured of sufficient size from which to make a bar, when

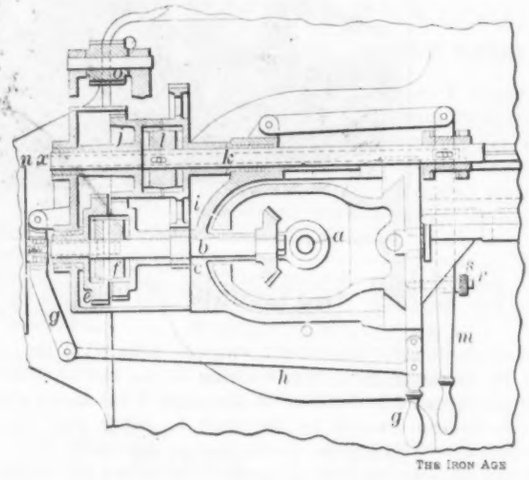


Fig. 4.—Sectional Plan.

THE DRESES NEW 48-INCH RADIAL DRILL.

it is taken out of the furnace and is squeezed into a bloom. At other times the boiler is required to heat this material to a point at which the cinder is taken from it. This is called 'fomenting,' or, in other words, boiling. It requires considerably more work, and when a man is required to line a furnace with clay or hot cinder fix it is agreed to pay the additional price."

Some Facts About Meters and Transformers.

It is well known to managers that the poor financial condition of their lighting and power companies is often due to the excessive losses arising from the use of old types of meters and transformers. Such meters run slow after being in use for some time, on account of increased friction in the moving parts, which can usually be traced to heavy moving elements, rough commutators and very often to the dust which, sifting through poorly sealed cases, lodges in the movements. The source of these losses has been recognized and has resulted in many cases in the old apparatus being replaced by that of modern characteristics.

The experience of a station which has made such a change may be recited. The central station referred to is operated by steam power furnishing current for lighting residences and business places, principally the former. During the year 1899 the plant was operated during the night hours only, and there were in service on its circuits 353 transformers and 406 meters, all of old types. The customers were metered.

Being satisfied that the distributing system was very inefficient, the superintendent decided to demonstrate this to the management. There being no primary wattmeters on the switchboard for measuring the total output of the station, no comparison could be made with the amount of current paid for, and he was compelled to arrive at this comparison by a different method. After considering the merits of the various wattmeters on the market he purchased a 10 ampere, 100-volt Westinghouse round pattern wattmeter, which was installed in a residence in series with a 5 ampere meter of the type then commonly in use on the circuits. Before making the test the old type meter was completely overhauled and cleaned.

At the end of ten days the old meter indicated a consumption of 24 kw. hours and the Westinghouse wattmeter 29.1 kw. hours, a difference of 5.1 kw. hour, or 21.25 per cent. This, at the average rate charged for current at the time, resulted in a loss of 9.16 cents per night on this customer. It should be noted that the old meter had the advantage of being larger and had been thoroughly cleaned just before the test was made. The above test resulted in the purchase and installation of Westinghouse primary wattmeters. During the year 1899, when the old meters and transformers were in use, the station output was as follows:

	January.	July.	Year.
Kilowatt hours generated	36,483	22,376	379,112
Kilowatt hours sold	13,945	5,888	118,992
Per cent. sold	36.8	26.3	31.4
Kilowatt hours generated and 1 kw. hour sold	2.5	3.89	3.19

The above indicates that for the year 1899 3.09 kw. hours were generated for every 1 kw. hour paid for, or, in other words, only 31.4 per cent. of the generated current was paid for, the remainder being lost by the old transformers and inaccurate meters. A revenue of $21,375 was received for the 118,992 kw. hours sold during this year, making an average price of 17.97 cents per kilowatt hour.

The operating expenses of the generating station during the same year, including all labor and material, interest on bonds, taxes, cost of collections, insurance, free lamp renewals, advertising and general expenses were $14,406.25, making an average cost of approximately 3.8 cents per kilowatt hour generated, or 12.15 cents per kilowatt hour sold, leaving an average profit per kilowatt hour sold of 5.82 cents.

It was decided to substitute a few large transformers having the same aggregate capacity as the 353 smaller ones, and to use short secondary distributing systems. By this means current was furnished to a greater number of customers, and the core loss in the transformers was reduced by 22,500 kw. In other words, the capacity of the generating station was increased by an amount equal to the installation of a 22½ kw. generator without any additional expense whatever for generating plant. The old meters were replaced by Westinghouse round pattern wattmeters during the months of April, May and June, 1900. A test of the new meters and transformers was made in July, 1900, to compare with the test made on old meters and transformers in July, 1899. The following is the result:

	July, 1899.	July, 1900.
Kilowatt hours generated	22,376	19,015
Kilowatt hours sold	5,888	8,589

In July, 1900, a 24-hour service was furnished in place of the 12-hour service of the previous year, but notwithstanding this and the fact that additional customers had been secured during the year, the station output decreased for July by 3361 hours. With the new meters and transformers the company gave 24 hours' service during July, 1900, with a generated amount of 3361 kw. hours (15 per cent. less than with the old meters and transformers), and at the same time received payment on 2701 kw. hours., or 46 per cent. more than with the old meters and transformers with a 12-hour service. This resulted in a decreased cost in coal for the month of $53.77, with an increased revenue of $465.19, or a net gain for the month of $518.96.

Below is given a comparative statement of the results obtained for the years 1899 and 1901.

	1899.	1901.
Total kilowatt hours generated	379,112	650,570
Total kilowatt hours sold	118,992	427,567
Kilowatt hours generated to 1 kw. hour sold.	3.19	1.52
Per cent. of generated current sold	31.6	65.7
Total cost of current generated	$14,406	$27,610
Cost per kilowatt hour generated, cents	3.8	4.24
Cost per kilowatt hour sold, cents	12.135	6.49
Received for current generated	$21,375	$58,534
Number of customers	406	803
Average price received per kilowatt hour, cents	17.97	13.69
Average profit received per kilowatt hour, cents	5.82	7.20

The increased cost per kilowatt hour for generating current in 1901 was due to an increase in the cost of coal and supplies.

The changes in meters and transformers increased the per cent. in 1901 and reduced the cost of the current sold from 12.15 cents per kilowatt hour in 1899, to 6.49 cents in 1901. The average net profit per kilowatt hour sold increased from 5.82 cents in 1899 to 7.2 cents in 1901, although the average price charged to customers had been reduced from 17.97 cents in 1899 to 13.69 cents per kilowatt hour in 1901.

Customers were pleased with the reduced price and the accuracy of the meters, and their number increased from 406 in 1899 to 803 in 1901. This additional business necessitated an increase in generating capacity from 275 to 400 kw.

In 1902 (23 months after installation) 50 of the new round pattern watt meters were tested to ascertain their accuracy. Out of the 50 meters tested it was found that 49 had not deviated from the original calibration—that is, 2 per cent. plus or minus from 2 per cent. of full load to 50 per cent. overload. The other meter was found to run 4 per cent. fast. All meters operated on the baby filament by a hylo lamps and none of them crept.

It is a curious fact that in purchasing boilers, steam engines and dynamos great weight is laid on the matter of efficiency (which can vary but a few per cent. in the most efficient and inefficient dynamos), nevertheless meters and transformers are purchased almost entirely on price, without regard to their efficiency.

It is authoritatively stated that October 1 is the date now fixed by the Lackawanna Steel Company for the inauguration of steel rail making at their new plant at Buffalo. The company have 7000 men at work on their great plant, and are rushing it to completion.

The headquarters for the United Iron & Chemical Company, manufacturers of spelter and of sulphuric acid, have been changed from Kansas City to Argentine, Kan., where one of the works is located, the zinc works being at Iola, Kan.

Expert Evidence.

BY EGBERT P. WATSON.

An expert in any class of technical evidence is "between the devil and the deep sea," the former impolite personage being represented by the litigants and the deep sea by the exponents of the law. He is sworn to tell the whole truth and nothing but the truth, but his efforts to do so are "cabined, cribbed and confined" by the opposition to his evidence and often overruled by judges from their inability to strike a true balance of the purport of the expert's statements, as between the legal points involved and the technical importance of it. Categorical answers are demanded of him, when, from the character of the counsel's questions, and the fact that several conditions are grouped together in one question a categorical answer is impossible. His failure to answer positively one way or another discredits his testimony and throws doubt upon his ability, when if the query had been properly made the reply would have been lucid and convincing. For example, suit was brought to recover for bad workmanship on a boiler; the expert witness being on the stand was handed a rivet and asked to say whether it was good or bad workmanship in its present condition. This rivet was bent and distorted and only the head end and three-fourths of its length remained. The answer of the witness was that it was impossible to say from the exhibit itself; it depended upon the conditions in the case. Counsel then asked the expert whether he knew good work from bad (the intention being to irritate him so that he would make a damaging admission), and the expert replied, imperturbably, that he did; when counsel then demanded that he state positively whether the exhibit showed good or bad workmanship. The expert replied that it was bad, when if he had been allowed to say why it might be either good or bad, according to the conditions under which the exhibit was obtained, the opposition might have elicited an answer that would have been favorable to his side for these reasons: Rivets driven into holes that are blind, as it is called, show unmistakably when taken out whether the holes were fair or not, by an offset in their bodies; again, rivets may be bent by careless driving out when the rivet holes were perfectly true. The manner of their removal has everything to do with this, and the object of removing them has also a bearing upon the condition of the rivet. If a boiler is to be wrecked (that is, cut up for old iron), the rivet heads are knocked off in the quickest way, usually, by a set hammer on the head end, but if they are taken out for the purpose of repairing any part, the riveted ends are cut off carefully with a flogging chisel. Now to merely give a witness a bent rivet and require him to say upon oath that it showed good or bad workmanship proves nothing, for he can testify either way and yet save his face, as the Chinese say. No witness would be allowed to state his reasons for his opinion at length; objections would be raised promptly by one side or the other, and tedious arguments with references would be brought forward by both sides to discredit the expert's assertions. In one case three-quarters of a day was taken to exclude a written deposition of an expert, as to its admissibility as evidence, but certain portions of it—the vital points—were read and argued before the jury; although the document was finally ruled out by the court the jury had paid full attention, were in possession of its purport, and it undoubtedly influenced their decision. Palpably the object in engaging experts to testify is for the purpose of getting all the facts from an engineer's point of view, and it would seem to be the better part of valor to consider them as establishing such portions as are inquired into. The fallibility of human evidence is undoubtedly a point to be argued by counsel, that is not objected to here, but it would seem to be stretching a privilege to assert, as is frequently the case, that an expert's testimony is valueless because it does not coincide with other testimony from persons who have no experience whatever, and who are, consequently, unable to form an opinion from that fact alone.

Another point is that experts do not reply to questions from a legal aspect but wholly from a professional one. The first may conflict with the last, but this does not disqualify the expert in any way; it is for the attorneys to show the relation between the value of the evidence technically, and its value legally, but this is seldom done, for the simple reason that the lawyer does not comprehend the technical aspect of the testimony he has elicited. During a trial of a boiler case, a few weeks ago, the question of the amount of expansion and contraction certain tubes were subjected to came up. An expert was asked how much heat some of the tubes were exposed to; he replied, "to the direct heat of the fire whatever that might be." He was then asked what the probable heat of a fire was and he answered that it would vary from 1000 degrees in poor condition to 2400 degrees in the best condition. The counsel then assumed that the fire was 2400 degrees, and asked if the tube was not of the same temperature, and he answered "No." The expert was then asked to tell why it was not when he said that the tube was full of water, which carried off the heat, or absorbed it as fast as it was renewed from the fire; so long as water remained in the tube it could not be heated to anything like 2400 degrees. The counsel then demanded to know why not, and the expert answered that it was because it would be at nearly a white heat, close to the melting point of the metal. This would appear to have closed this particular point in the testimony, but the advocate did not think so, for, like a boy with a bouncing ball, he pursued it up and down at much length for some time, ending without making any point of importance.

To know when to stop questioning an expert and avoid the danger points of Scylla and Charybdis is a valuable faculty to a lawyer; if he has established, or at least testified to, certain things which favor the catechist and help his case materially, something has been gained. To continue the examination further in the hope of getting still more damaging evidence from the expert is dangerous, because he may testify in such way as to give an opportunity to the other side to cross examine and elicit a set of facts which will nullify if not destroy all the advance made. In the same case above cited, an inspector gave damaging testimony to the plaintiff, and might have caused a great deal of trouble later. It was essential that his testimony be discredited and the force of it upon the jury materially modified if not rendered wholly inocuous. He was of the cock-sure type of witness, and when cross examined by the prosecution a toboggan slide was prepared for him to glide swiftly to oblivion. The inspector was asked several apparently trivial questions as to his duties, to all of which he answered almost before the prosecutor had ceased speaking; he was then asked some crucial questions not at all related to his responsibility in the premises and gave evasive answers; he began to get rattled and finally, when confronted with the inquiry if he had inspected every single detail of the boiler, and had answered "No," squarely, the prosecutor rejoined: "Then you only partly inspected the boiler, Mr. Inspector! That will do," and waived him off the stand crestfallen. Aside from the legal value of the evidence an expert may give he is confronted with another duty, which is to explain to the jury and the counsel the why and wherefore of certain operations in the particular machine or process being tried. It is a comparatively simple task to testify as to details and workmanship, for there are but few persons who cannot detect flagrantly bad work when it is placed before them, but the expert's task is much increased when it comes to demonstrating to unmechanical minds the relations of one part to another, and the sequences of operations in machines or apparatus; not all experts are capable in this direction. What is a matter of course to him and clear as the sun at noon, is an impassable technical morass to the judge and jury, yet these are the very persons who must be given a clear idea of cause and effect if they are to act impartially in the discussion of damages or tresspasses of any kind. In the trial of a suit for damages for malconstruction of a steam boiler the expert was called upon to explain the construction of it, which he did by the aid of a model; after pointing out the several parts (which were detachable) and explaining that the furnace was surrounded by water constantly, he was somewhat surprised to be asked how the ashes were kept out of the water! To an engineer this is an absurd question, but the inquirer was not an engineer

and he had to be told that the furnace in this case was the same as that in a cooking stove, a solid portion of the boiler with a grate in the bottom of it, the ashes falling through the grate into the ash pit beneath, and having no connection with the water in the boiler or access to it. Such information must be wholly free from any tinge of sarcasm or cynicism, imparted as a matter of fact indispensable to the success of the suit. There are occasions in the course of trials when the opposition will endeavor to confuse an expert, particularly a dangerous one (lawyers are swift to detect such an expert) in order to destroy the effect of his evidence upon the jury, so he must be alert to possess his soul in patience against surprises of this kind. It is here asserted that experts in technical cases are absolutely indispensable; in no other way can trade facts be brought out. Generally speaking, their word is law, and, if they are experts in fact, their evidence is unimpeachable, in most cases accepted by intelligent juries; they contribute materially to winning a case. As to losing it, that depends upon how their testimony has been used by counsel. It is not uncommon for lawyers to get confused upon evidence that has been given by an expert and, unwittingly, wholly destroy the force of his testimony. The expert is not responsible for that, but he not unnaturally wonders what a lawyer would do to him under similar circumstances.

Marine Boiler Regulations.

Supervising Inspectors to Recommend Important Legislation.

WASHINGTON, D. C., June 23, 1903.—The Board of Supervising Inspectors of the Steamboat Inspection Service has decided to recommend to the Secretary of the Treasury a radical change in the scope of the laws and regulations. It is proposed to repeal a large part of the laws governing the Steamboat Inspection Service, eliminating all details concerning boilers, and to enact a provision clothing the Board of Supervising Inspectors, with the approval of the Secretary of the Treasury, with power to embody such details in the code of regulations, which can then be changed from year to year to meet improvements in practice. This plan practically ignores the proposition of the boiler manufacturers for the appointment of an expert commission to revise the boiler regulations and is likely to develop a sharp controversy before the questions at issue are disposed of.

The chief consideration with reference to the construction and inspection of boilers that has induced the board to recommend the repeal of existing statutes is the fact that numerous provisions of the laws are now obsolete, but being set out in detail, they are nevertheless binding upon the board and upon the Treasury Department and cannot be amended by modifications in the regulations. Improvements in construction are being made from year to year, but the members of the board are not at liberty to recognize these advances when called upon to inspect steel plates or finished boilers, and this unsatisfactory condition is likely to be emphasized in the future, as the difficulty of obtaining special legislation at the hands of Congress undoubtedly increases every year.

Flaws in the Statutes.

An important case in point has been brought to the attention of the board by several of the leading boiler manufacturers of the country. Section 5 of Rule 2, relating to boilers and attachments, provides that "where flat surfaces exist the inspector must satisfy himself that the space and distance apart of the bracing and all other parts of the boiler are so aranged that all will be of not less strength than the shell, and he must, after applying the hydrostatic test, thoroughly examine every part of the boiler." Under this rule it is stated that many boilers have been rejected for the sole reason that the shells are in excess of the requirements which are fully met by the bracing, &c. In the case of a boiler designed to resist a pressure of 100 pounds and with adequate bracing for such pressure, if the shell is found to exceed 100 pounds in the capacity of its resistance the law is construed to prohibit acceptance, although there can be no doubt of the full efficiency of the boiler.

Another frequent cause of complaint on the part of boiler manufacturers, as shown by the communications received by the board, is based upon the literal interpretation of Section 4433 R. S., which provides that, "the working steam pressure allowable on boilers constructed of plates inspected as required by this title, when single riveted, shall not produce a strain to exceed one-sixth of the tensile strength of the iron or steel plates of which such boilers are constructed; but where the longitudinal laps of the cylindrical parts of such boilers are double riveted, and the rivet holes for such boilers have been fairly drilled instead of punched, an addition of 20 per cent. to the working pressure provided for single riveting may be allowed: Provided, that all other parts of such boilers shall correspond in strength to the additional allowances so made, and no split calking shall in any case be permitted." Manufacturers point out that the only joint recognized in the above provision is the single or double riveted joint, whereas double butt strap triple or quadruple riveted joints are now in common use, adding greatly to the strength of the boilers. Under existing law no joint is recognized as having a strength in excess of 70 per cent. of that of a solid plate, whereas the best modern practice recognizes joints showing 90 per cent. of the strength of the plate.

The two illustrations given of the difficulty of properly enforcing the present law are referred to in the great majority of communications received by the board, but neither the board nor the Secretary of the Treasury can furnish the desired relief, because of the fact that these requirements are provisions of the law and not of the regulations. It is therefore proposed to repeal all statutes dealing in detail with boiler construction and inspection and to re-enact Section 4405 R. S., which provides that "the board shall establish all necessary regulations required to carry out in the most effective manner the provisions of this title and such regulations when approved by the Secretary of the Treasury shall have the force of law." Only general principles will be set out in the revised law to be recommended to Congress, and the whole code will therefore be subject to annual revision by the board.

It is recognized by the board that it may not be a simple matter to secure the desired legislation from Congress, and it has therefore been decided to revise the present regulations in accordance with the recommendations of the boiler manufacturers wherever the changes can be made without infringing the letter of the statute. In this respect the revision will be the most important which the board has ever made, but it will nevertheless be regarded as a makeshift intended only to stand until Congress furnishes the necessary authority to make much more important and more generally desired changes.

The Expert Commission Plan.

It will be seen that the board takes no account of the movement on foot among boiler manufacturers, as laid before it by representatives of the American Boiler Manufacturers' Association last week, to secure the passage of a bill authorizing the appointment of an expert commission to revise the laws with respect to the inspection and construction of boilers. On this point the views of the manufacturers and inspectors are decidedly at variance. The manufacturers desire that the laws shall be revised in detail and then re-enacted, while the inspectors wish all the details to be treated as matters of regulation only, in order that annual revisions may be had without the necessity of appealing to Congress. This important difference will probably be brought to a sharp issue when the board's report is laid before the Secretary of the Treasury. His indorsement will be necessary to the presentation to Congress of the text of the law as framed by the inspectors, and the American Boiler Manufacturers' Association will also seek to have the Secretary again indorse the plan for an expert commission. The Secretary may be able to suggest a compromise of some kind, but unless a satisfactory arangement is made the boiler manufacturers will probably demand to be

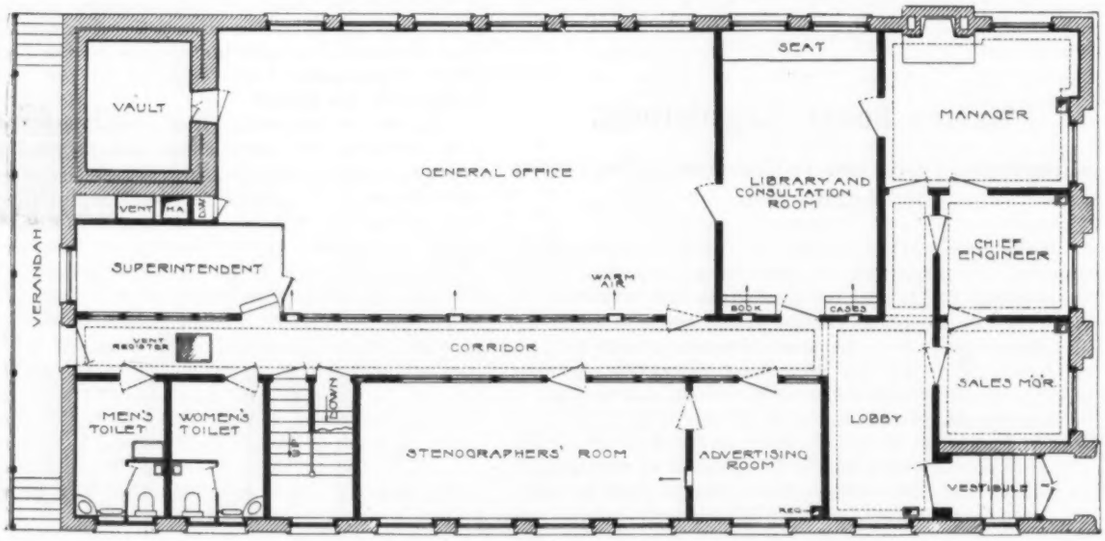
heard by the appropriate Congressional committees upon the recommendations of the inspectors and will urge the commission bill as a substitute measure. W. L. C.

American Blower Company's New Office Building.

Heating and Ventilating System.

The accompanying engravings show the new office building of the American Blower Company of Detroit, Mich. The business of this company has increased so rapidly during the last two years that the old offices, which occupied valuable space in one of the factory buildings, became entirely inadequate to accommodate the increased office force.

The building is faced with standard size paving brick in various shades of brown, laid in dark mortar and with Flemish bond. The trimmings are of buff Bedford limestone, producing a very pleasing and effective combination. The windows are of plate glass and have been arranged to give the best possible lighting effect, especially in the drafting department. The first floor, Fig. 1, is occupied entirely by the different commercial departments, while the second floor is used by the engineering and drafting departments. The basement is used for the storage of catalogues, letter files, &c. A small building on the roof is the blue print and dark room, being located in that position to secure the best light for sun printing.



Plan of First Floor.

AMERICAN BLOWER COMPANY'S NEW OFFICE BUILDING.

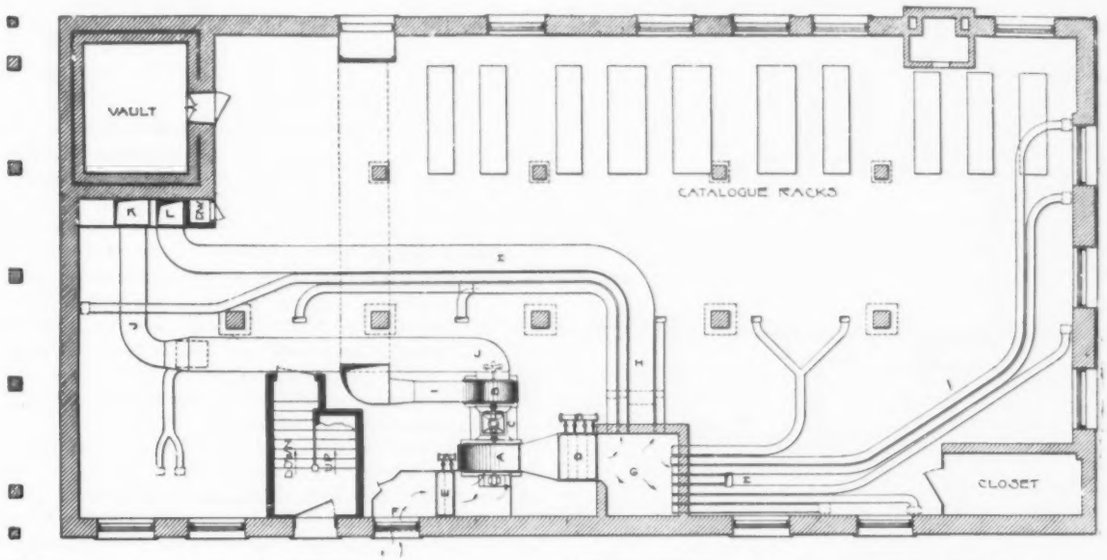
The interior finish of the building is of rich design and pleasing effect. The first story is finished in Flemish oak with natural oak floor. The second story is finished in stained Louisiana cypress with maple floor. The decoration of the library and consultation room on the first floor is quite elaborate, although in keeping with the general design of the building. It is finished in Flemish oak, the floor being of dark polished oak. The 6-foot paneled wainscoting, decorative frieze and wood cornice give a very rich and attractive finish to the room. The furniture is of dark oak.

The main interest in the equipment of this building is in the mechanical system of heating and ventilating. As the manufacture of heating and ventilating apparatus forms a large part of the company's business, this part of the office equipment naturally received due attention. The apparatus is located at one side of the basement, as shown on the accompanying plan. The fresh air enters the building through the basement window F and by means of the fan A is drawn over a coil of pipes, E, called the tempering coil. The steam pipes in this tempering coil are just sufficient in number and length to heat the volume of entering air to a temperature of 65 or 70 degrees F. The fresh air is then drawn into the fan and forced over another heater, D. This is the main heater and is designed to heat the air to about 140 degrees. Beyond the heater is located a large brick chamber, G, called the plenum chamber. This serves as a reservoir for the heated air, and from this chamber the air is conveyed by galvanized iron pipes, H, to the various offices. Under the main heater D is a passage or by-pass, which permits a part of the air from the fan to pass under the main heater coil and into the plenum chamber. This passes into the lower section of the plenum chamber, which is separated from the upper part. Thus the plenum chamber is divided into two parts, as shown by Fig. 3, the upper chamber containing hot air at approximately 140 degrees and the lower section tempered air at 70 degrees. As shown by this drawing, each individual pipe leading off to the offices above has two connections to this plenum chamber, one branch to the upper section and another to the lower. In each main where the pipe divides into these two sections there is located a set of double swinging dampers or mixing dampers. Each set of these dampers is controlled automatically by a diaphragm valve, shown on the outside of the pipe. These automatic valves are part of a system of automatic heat control, which was furnished by the Johnson Electric Service Company of Milwaukee, Wis. These valves are operated by compressed air, which is supplied by a small air compressor located in the basement. This compressor works by city water pressure and delivers air at about 15 pounds pressure.

The system of temperature regulation is as perfect in operation as it is simple in principle. In each office is located a thermostat which can be set to control the room temperature at any desired point. These thermostats work upon the principle of the unequal expansion and contraction of brass and steel. They are all connected by head pipes, of about ⅜-inch bore, with their respective diaphragm valves. On the expansion or contraction of the parts of the thermostat, air pressure is admitted or cut off from the diaphragm valve and the mixing dampers are swung one way or the other, as the case may be. It will be noted that these mixing dampers in swinging do not cut off the flow of air, but simply vary the proportion of hot and tempered air as controlled by the thermostat to maintain a constant temperature in the room. Thus a constant flow of pure air of the proper temperature is maintained at all times. Under the tempering coil there is also a by-pass similar to the one under the main heater. This by-pass is fitted

with a swinging damper, which is controlled by a thermostat placed in the upper part of the plenum chamber. Thus if the air in the plenum chamber becomes too hot the thermostat opens the damper under the tempering coil and allows the entering air to pass under the tempering coil, instead of through it. The air is admitted to each room at a point about 8 feet above the floor. As shown in the cut, the fan is operated by a direct connected vertical engine. This engine is also the company's own make and is specially designed for this class of work.

Another unique feature of this plant is the exhaust fan, which is direct coupled to the same engine which runs the heating fan, and which draws the impure or vitiated air out of the building. Thus while one fan is discharging pure warm air into the building the other fan on the same shaft is drawing out the impure air. This is the main feature of mechanical ventilation which has brought it into such general favor during the last few years for use in public buildings. In each office on the first floor is located an ornamental register face at the floor line, opening into the corridor which extends through the center of the office. The air is thence drawn down through the large register in the floor at the rear of the corridor and after passing through the exhaust fan is forced outside the building. The air from the drawing room and second-story offices is drawn down through the flue at side of vault.



A. Plenum fan.
B. Exhaust fan.
C. Engine.
D. Heater coil.
E. Tempering coil.
F. Fresh air Inlet.
G. Plenum chamber.
H. Warm air distributing pipes.
I. Exhaust discharge duct.
J. Exhaust inlet duct.
K. Vent flue.
L. Warm air flue.

Fig. 2.—Basement Plan.

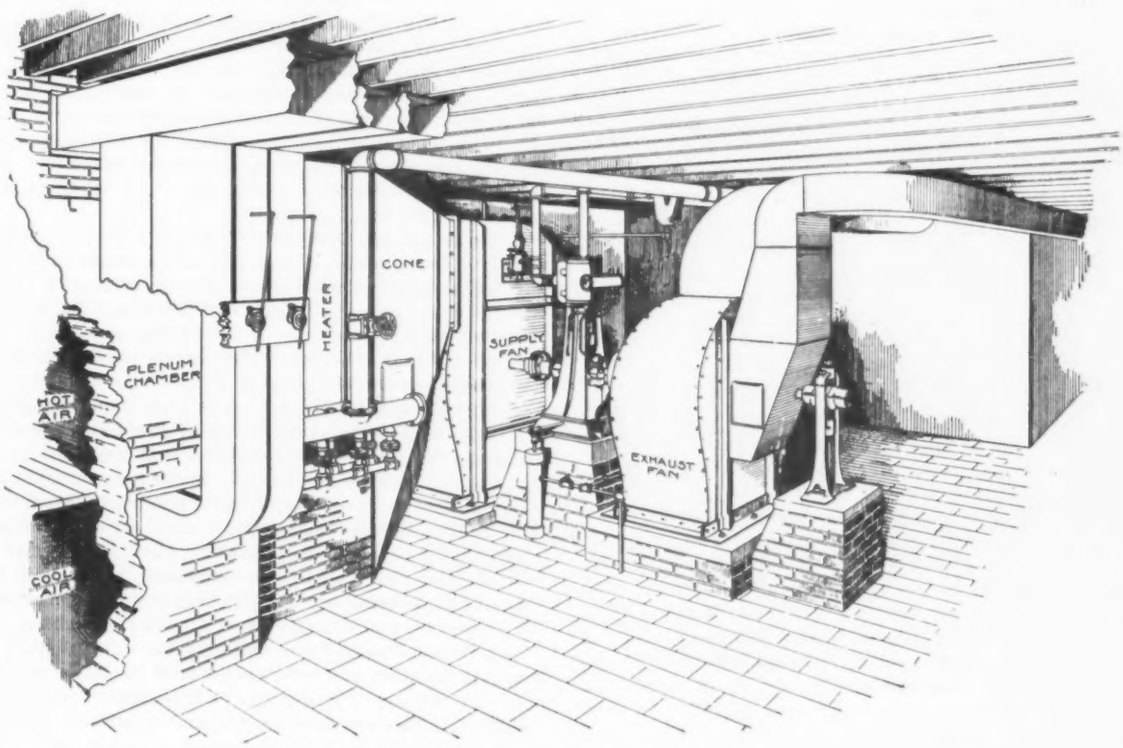


Fig. 3.—View in Basement.

AMERICAN BLOWER COMPANY'S NEW OFFICE BUILDING.

Only one thing remains to be mentioned, and that is the economy of this system. As the heating coils utilize the exhaust steam from the factory engine, which is brought into the basement through an underground conduit, and as the fan engine exhaust is also turned into the heater coil, the cost of operating the system is practically nothing, as only steam that would otherwise be wasted is used, and without back pressure.

The condensation from the heating apparatus is returned to a Webster feed water heater located in the engine room of the factory, by means of the Webster vacuum system, which was furnished by the American Engineering Specialty Company of Chicago. This same system handles all the condensation from two other heating plants located in the factory. The advantage of this vacuum system is that it eliminates the back pressure from the factory engine, when using exhaust steam for heating, and also removes the air from the heating coils and connecting pipes as fast as it accumulates, thus making the heating surface far more effective than it otherwise would be.

The Continuous Operation of the Iron Foundry.*

BY JOHN C. KNOEPPEL, OSWEGO, N. Y.

The writer desires to be understood as not being antagonistic to the continuous operations of our foundries, recognizing as he does the general progress of the trade in this country, as well as the inventions brought out to develop and cope with the demands for castings to meet the requirements of our customers. The fact cannot be contradicted that the foundries in this country are entering into an era of improvements and facilities gigantic in their proportions. All of this naturally suggests to the advanced founder that the most economical ways and means to secure the best results are to operate the foundry continuously. In giving my views on this important subject I write from the standpoint of a practical molder and foundryman of over 30 years' experience in all lines of castings, and will at the outset make mention of several features that we as foundry managers should give careful and thoughtful consideration.

1. Do the present conditions of the foundry business warrant the operation of the foundry on the continuous plan? 2. Would this be to the best interest to the foundrymen in general from the point of view as a paying investment? 3. Would the expenditures necessary for the continuous operation of the foundry give adequate returns? 4. Would the output be of a better quality? 5. Would not the continuous working of the foundry tend to increase the wear and tear of machinery, tools and maintenance? 6. Would the continuous operation of our foundries be beneficial and healthful to the workman and his family? 7. Would it not become monotonous and tend to retard general progress, rather than to increase it by the environments, being a sameness from day to day, and have a tendency to decrease the capacity and ability of the molder and mechanic? 8. Would it not have the effect to decrease the qualifications and skill of the individual man and molder by this continuous work and constant humdrum of foundry life, and thereby lessen the ambition of the young man who enters the foundry as an apprentice with the view of becoming a molder and a mechanic? 9. With the present supply of help, both molders and general laborers, can the foundry be operated on a continuous basis successfully when we consider the scarcity of all classes of labor, the rate of pay, and the demand and supply of work, all of which govern the successful operation of a foundry?

When we consider the present times and the general progress the foundry has made during the past 10 or 15 years it is no wonder that many are inclined to the idea of operating a foundry on a continuous plan as being the most economical as well as profitable way of obtaining the best results and greatest returns. This subject is a very natural one and timely when we consider the enormous trend of business and the close competition in our products, taking into account costs, together with the possibility of a shorter working day and the desire of the molder to curtail his output. Under these conditions would the continuous operation of the foundry be profitable? As managers of foundries we are asked to pay an honest day's wages and in return we expect to obtain an honest equivalent of work per day. Do we obtain this and can we as foundrymen get it at all times? Are we not handicapped in many localities and forced by circumstances to hire men who are not capable and in this way increase the cost of our product and output? As foremen and managers our mission is to operate the works under our control so that we may give to our employers a fair interest on the money they have invested.

Present Conditions Do Not Warrant It.

Under some conditions as they exist at present we might be led to believe that a continuous operation of the foundry would be the best plan to follow in order to obtain the greatest returns. In order to answer this question intelligently it seems to me that the first thing to ascertain is whether present conditions would warrant this. In a general way the writer is inclined to the opinion that they are not favorable. In the continuous operation of a foundry the wear and destruction of machinery and tools would be greater in proportion than under the present plan of operation, for by continuous working the time for repairs would be limited.

Again, would it be to the best interest of the foundry business in general, considering the expense and outlay of capital, to encourage this plan of operation? Are we as foundrymen prepared and physically able to cope with and handle the work if allotted to us, and can we stand the strain of responsibility included in the management of a foundry on the continuous plan? The writer finds that the foundryman of to-day in a progressive shop has his hands full to keep up his end and come out ahead at the end of the year.

Further, would the output of a foundry be of a better quality than it is under the present methods of operation and condition? Where large bodies of men are employed we find it a difficult matter to keep and hold steady men, and the more we have to employ the worse will this evil become. Then, again, where the same work has to be continued and performed by different shifts of men this does not always result satisfactorily and would consequently give more chance for mistakes and loss to the foundry.

It is also likely that continuous work in the foundry would be injurious to the health of the molder, as the fact remains that a molder working by natural daylight and under normal conditions can perform his work to better advantage and with less percentage of mistakes and loss than occurs where a foundry is working under a continuous plan or with two or three shifts of men.

The continuous operation of an iron foundry on general principles is not productive of the best results in molding and castings for the reason that the work is not performed as uniformly well as under present systems, where the men are in much better condition to perform their work, and labor with greater zeal and ambition and consequently obtain better results. Continuous work is irksome and tiresome to the individual, who needs his normal rest to reinforce him for the next day's labor, and the proper time to obtain this is during the night.

There would also be a tendency for other disturbing elements to arise, and mistakes would be liable to happen more frequently where two or three shifts of men are employed. The constant hustle and bustle in foundry work during the molding and casting, where this takes place at the same time, would naturally detract the attention of the men from their work, and as such would be the means of producing mistakes and accidents. An increasing number of patterns and flasks would also be required, as well as a larger force of molders and helpers.

While the melting might be done continuously to accommodate the changed conditions there will be a tendency to increase the cost of repairs, and the installation of additional cupola capacity would mean further expense and the employment of more help. There will be bound to be more or less confusion where a large quan-

* Paper read before the American Foundrymen's Association, Milwaukee, Wis., June 9 to 11, 1903.

tity of metal is being melted and handled and the foreman would require assistance to keep things moving in the right direction. In view of this increased cost of production, will it pay to arrange and fit up our foundry to run continuously? In case of break downs, shortage of work or delay of any kind there will be losses which would materially increase the cost of the output.

Labor Presents a Problem.

There is no question but that there will be an increase of foundries operated on the continuous plan, but in a general way it is doubtful if the majority of us are prepared to take up this question at this time. The shortage of molders and core makers has put the majority of the managers and foremen of foundries in a serious predicament and the introducing of continuous operation of foundries at this time would no wise remedy existing troubles. To overcome the shortage of capable men we are putting in molding machines and the very best improvements that can be secured, yet it is to be remembered that before molding machines can be worked men must be found to handle them. I believe we have a sufficient number of foundries in this country to handle all the business that has to be done under our present methods and conditions. Where foundries are being operated continuously and successfuliy it will general be found that the product is under their own control and is being duplicated by the thousand. The demand which has existed for castings for the past four or five years is not likely to be with us always. What we need more than anything else is the proper management of our works, so that a larger output can be secured per man. This can best be accomplished by constantly keeping the molder employed during the day and providing him with the proper tools and supplies in time.

It has been my experience that mistakes are largely due to work being performed on the same job by a number of men, or by different shifts of men. I have yet to see a molder who does not prefer to do his own pouring, and to my mind a very large number of castings, no matter how well the molds are made, can be and are lost through improper pouring, and so it is where more than one party is engaged on one job, the blame and responsibility is always shifted to the other fellow, and hence the responsibility of the individual molder is lessened. No doubt the continuous operation of our foundries will be in line with future progress and shorter hours, and the reconstruction of foundry methods, but all of this is a new development upon which further education must be had for both employer and employee.

I am of the opinion that a much larger field is in store for the molding machine in the future, partly on account of the scarcity of molders, which forces the manufacturer to avail himself of every practical invention brought out to reduce the cost of his castings. I have always found it a good investment to have the men out of the shop in time, as they are then in a better mood and condition to resume their labors next day. In shops making it a practice of being late the men in general do not take kindly to this and we cannot blame them for it. Where the molders know that they will get home in good season they will be more ambitious to accomplish their work on time and I prefer to allow them to go home when they are through casting. In my judgment it is poor management to keep the men sitting around in wet clothing waiting for quitting time, and I find I can get more work out of them by treating them like men and being reasonable in all things. It is not always possible to leave the shop on time, and where such is the case I find they are willing to help out when they know the circumstances. In my opinion the manager of a foundry does not have to exact the last minute's service from an employee in order to make money for his employer.

Two weeks ago the Alliance Machine Company, Alliance, Ohio, celebrated the first anniversary of the establishment of their business. From a small beginning in June, 1902, and with but few orders on the books, the business has grown until now there are 210 men employed, night and day, not including the 30 or 40 molders in the Bach foundry, who are constantly engaged in turning out work for the Alliance Company, though they do not do all of the molding. On the company's books are the names of representative concerns in their respective lines, from whom they have received orders for 122 cranes. Since September they have shipped and placed in operation 76 cranes, and two of the largest electric traveling tables in the world were delivered to the Carnegie Steel Company last January. The company will ship 15 cranes this month, including one to Mexico and two to Canada; an 8000-pound drop hammer to the Transue & Williams Company of Alliance, and a 2000-pound drop hammer to the New Castle Forge & Bolt Company of New Castle, Pa. The company have under consideration the manufacture of two new lines, and if present negotiations are carried through successfully they will build a duplicate machine shop and a new foundry of about the same dimensions as the present one. It is not probable, however, that the new buildings will be erected before next spring. W. H. Purcell is general manager. The Power Specialty Company of 126 Liberty street, New York, are the exclusive hydraulic machinery agents for the East.

The Mohawk Valley Steel & Wire Company.

A complete separation of the Brunswick & Birmingham Railroad Company and the Mohawk Valley Steel & Wire Company has been effected, says the New York *Commercial*, and F. A. Umsted, president of the latter company, has been eliminated from the affairs of the railroad. It is considered probable that Col. E. C. Machen, the builder of the road and its former president, will resume the management, but no official statement on this point is obtainable.

The chief interests in the railroad are thoroughly dissatisfied with their dealings with Mr. Umsted. It is hinted that the latter's projected $10,000,000 steel plant has fallen through entirely for the lack of funds, and that the resources of the company were misrepresented in order to obtain control of the road.

The operation of the road itself has not been interfered with. According to official statements the portion already completed is earning $12,000 a month in excess of fixed charges. The steel company had undertaken to complete the road to Birmingham, but it is understood the work will now be done by the company themselves.

The Parks-Gates Suit Finally Lost.—The Special Term judgment dismissing the complaint in the action brought by John H. Parks against John W. Gates to recover a share in the profits realized on the formation of the American Steel & Wire Company was unanimously affirmed by the Appellate Division of the Supreme Court of New York on June 19. Mr. Parks alleged that he was a party to the original idea of forming the steel and wire combination, which, according to the plan, was to have been financed in 1897 by J. P. Morgan & Co. The project was abandoned because of the refusal of the Morgan house to assume the duties of trustee and treasurer, and because of dissatisfaction with reports of chartered accountants and depression of the money market owing to the Spanish-American war. The American Steel & Wire Company were finally incorporated in New Jersey in January, 1899, financed by Seligman & Co. The Appellate Court holds that the plaintiff was not necessarily interested in this second and successful effort at a combination of manufacturers, the original project having clearly fallen through.

The German Government is encouraging higher speeds upon its railways, and, to attain it, has proposed a competition between electric and steam locomotives. Builders of both types have been asked to submit plans for motors which will attain velocities of 100 miles per hour, but under what conditions of load and permanent way has not been stated. The capacity of our largest and most powerful locomotives, with 200 pounds of steam pressure per square inch and a very moderate load behind the tender, is limited to an average speed of from 60 to 65 miles per hour under favorable conditions; it remains to be shown what kind of a steam driven engine can be produced which will raise the speed 35 to 40 miles more per hour.

Lake Iron Ore Matters.

Royalty on Coal Mined in Minnesota.

DULUTH, MINN., June 20, 1903.—After considerable delay the State of Minnesota has settled upon a royalty rate of 7½ cents a ton on all coal mined from State lands. This is preliminary to the work of coal explorations on a considerable scale by the Quodenaw and Willow River companies in northern Aitkin County, who have applied for a rate and have taken State lands for exploration. A third coal mining company, intending to operate in the same vicinity, have been formed at Duluth and will file articles in a few weeks.

Ore dock No. 3 of the Great Northern road has been completed and is in use. It has already been described in this correspondence. All the upper lake railways are busy with ore, but not as busy as they expected earlier in the year, and, aside from the shipments of the Steel Corporation, business is distinctly disappointing so far. This affects the Great Northern more than either of the other roads in Minnesota, and its 1903 traffic will not come up to expectations by considerable. Ore ships are carrying coal up the lakes, which makes the trip longer in point of time, and so many ships are in the coal trade that receiving docks are clogged and are utterly unable to handle business with the dispatch desired, so that ore shipments are further delayed from this cause.

About 14 miles from Sidnaw, on the Chicago, Milwaukee & St. Paul road, in Iron County, Mich., a small iron ore prospect has been found the past week. A number of prospectors are in the vicinity and land is being taken for exploration.

Tests will be made this month by the Davis Calyx Drill Company of New York, to show the possibilities of their hardened shot drills for prospecting in hard ground. Several drills have been shipped here and will be thoroughly tested.

Mesaba Range.

The Crescent mine, just sold to the Minnesota Iron Company by M. L. Fay and associates, is a crescent shaped ore deposit lying closly adjoining Longyear Lake on its southeast shore. There are about 2,000,000 tons of merchantable ore in sight.

Work on the Steel Corporation's Higgins mine, near Virginia, is very nearly closed down for the present. It was expected that adjacent lands would be secured under lease, but the deal was not closed, which cut off the major portion of stripping area for the properties that were to go under the name of Higgins. If this deal is not closed later it is probable that little will be done at the Higgins this year.

Some of the explorations in 56-24 are showing well, and it is probable that several new mines will open there in the near future. In the southwest side of section 10 the Cleveland Cliffs Iron Company have a small ore body, but nothing else has been shown in that immediate vicinity. In section 13 57-22 the Tesora mine shows about 1,000,000 tons. Close to Hibbing a new property of about 2,500,000 tons has been shown, and in section 15 58-19 D. E. Woodbridge has about 2,500,000 tons so far shown. Nearly all these explorations are still under way and expect to become larger as exploration progresses.

Mining costs at some of the very shallowest deposits of the Mesaba range are surprisingly low. Properties that run from 40 to 15 feet, and even less, in thickness are being mined at a very low cost. The ore is opened to its extremities, sliced out, and the top is allowed to come down beyond the miners. There is no waste of ore and practically no timbering. Several shallow deposits are now being mined, one of them not exceeding 8 to 12 feet in places.

Forces have been cut at several of the independent mines of this range, notably at the Jordan of Corrigan, McKinney & Co. and the Pearce, and a few others.

Marquette Range.

At the Mary Charlotte mine, Marquette range, the company have let stripping contracts and work has commenced. About 1 acre is to be stripped off from 5 to 30 feet, the ore appearing as close as that to the surface. A shaft has been sunk 140 feet and drifts are run under the stripping, and ore will be milled down and trammed to the shaft, a distance of about 300 feet. A very large timber shaft house is under construction. The ore body is large and a good part of it is understood to be Bessemer. It is understood that negotiations are under way, in a preliminary way, for the sale or lease of the mine to a large operating company.

Marquette County mine valuations have been materially changed during the past week by the Board of Review. For example, some of the mines are assessed at the rate of over $1 a ton on their output, while others are paying but 30 cents a ton. The Blue mine is raised from $525,000 to $900,000, and the Mary Charlotte and Breitung, assessed last year as wild land, are now at $34,000 and $20,000, respectively. The Queen group is reduced from $275,000 to $125,000, on account of a diminution in the value of the property.

At the Republic mine the old and long abandoned Pascoe shaft is to be equipped with a double skip, air capacity is to be doubled and the water power to be increased materially. The mine is looking very well and the village is now assured of a long life. Shipments from the Republic have only been about 15,000 tons a month to date this year, but are to be trebled as soon as a shovel is put into the stock piles.

The eighth annual meeting of the Lake Superior Mining Institute will be held in the third week of August, beginning Tuesday, the 18th, at Marquette. The Marquette range will be the sole point of interest. A large attendance is expected.

Menominee Range.

On the Menominee range shipments are now heavy from the United States Steel Corporation's mines. At the Chapin they have two shovels at work in stock and are shipping about 5000 tons a day from that source. The daily hoist is somewhat less tonnage. On July 7 the stockholders of the Austin F. Mining Company meet to authorize the sale of the property to the Buffalo & Susquehanna Iron Company, who now have an option. At the Oliver Mining Company's Forest property drilling is being done and a considerable body of ore is said to have been cut above 400 feet down. Explorations have commenced on the Fesing lands, adjoining the Dunn Mine, at Crystal Falls. One diamond drill is at work.

An improved compressor plant for pneumatic haulage is being installed at Aragon mine. The capacity of the compressor is the compression to 850 pounds of 480 feet of air. Haulage will be installed on two levels at once. At this mine a drift 1200 feet long is being run from No. 5 shaft and is now in 900 feet. A large hoisting plant is going in at No. 5, which is 1080 feet and which will be finely equipped. It is expected that this shaft will be ultimately run from the power of Hydraulic Falls, transmitted electrically to the mine. Close to this new shaft the Oliver Iron Mining Company are drilling some deep holes and are said to be getting some ore.

A compressor of 30-drill capacity is to be installed at Loretto mine shortly. At the Eleanor mine, formerly Appleton, the shaft is now 250 feet deep, and a seam of ore has been cut that gives encouragement for future developments.

The big new steel lined shaft of the Chapin, to be called C. Ludington, has been well started and is now down about 30 feet. It is designed for a depth of 1000 feet and is to be the largest shaft in the lake region. Columbia's air compressor is to be moved to Mansfield mine. Unwatering of Beta shaft of Nanaimo is well under way, and exploring will be started in this part of the property before the larger Nanaimo shaft is taken in hand.

At the Baltic mine at Stambaugh they will strip the overburden of sand and gravel to the depth of about 25 feet. The mine has been growing deeper, and so much ore is held in the pillars and back of the upper levels that some way had to be devised of getting it out.

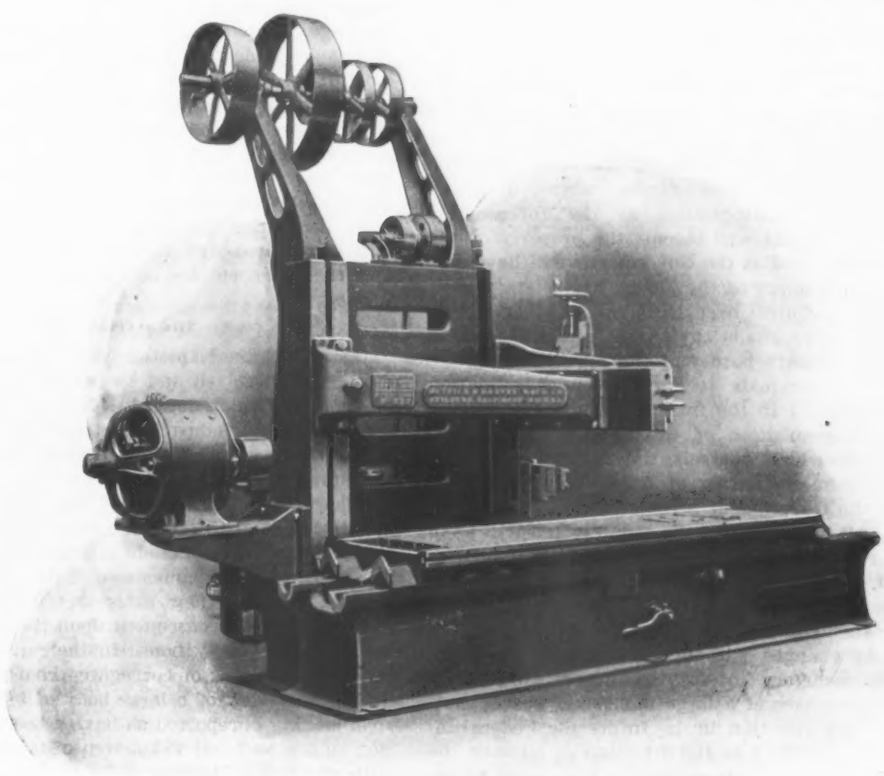
New Copper Smelting Plant.

The Copper Range Consolidated Mining Company of the South range, Houghton district, have prepared plans and will immediately erect a large plant, with five reverboratory furnaces and one cupola, all of the most modern and economical type. There will be three melting fur-

naces, 18 x 50 feet, and two casting furnaces, 15 x 32 feet. These are by far the largest furnaces ever contemplated for the lake copper country. A new device, so far as this district is concerned, will be the drying of all mineral before it enters the furnaces by means of waste hot gases from them. There will be no dipping from the casting furnaces. Slag containing copper values will be remelted in the cupola under air blast. It is claimed that the handling of material and furnaces will more nearly approach absolute automaticity than in any other copper plant. D. E. W.

The Detrick & Harvey Motor Driven Open Side Planer.

The method of electrically driving the 38-inch open side planer built by the Detrick & Harvey Machine Company of Baltimore, Md., is plainly shown in the engraving. The machine is provided with a countershaft carried by arms extending from the top of the post. A bracket is fitted to the back of the post, on which the motor is placed, the drive being by a belt extending from the motor shaft to a pulley on the countershaft. This arrangement makes the machine self contained. With the countershaft is usually furnished a fly wheel or heavy rim pulley of sufficient weight to reverse the planer platen without causing excessive fluctuation of the load on the motor.



THE DETRICK & HARVEY MOTOR DRIVEN OPEN SIDE PLANER.

The Electric Welding of Metals.

The electric welding of metals is being developed by the Thomson Electric Welding Company of Lynn, Mass., manufacturers of apparatus for welding, tempering, annealing, brazing, forging and shaping of metals by electricity. Machines for making field and other fencing and wire fabric of a variety of meshes are now in successful operation. The stay wires are electrically welded to the strand wires, procuring as advantages, it is claimed, that the stay wires are rigidly held in place and present a more attractive appearance than the twisted joint. It is also claimed that cheapness is procured by the saving of wire, and from the fact that the loom can be run very fast owing to the rapidity with which the joints are made. Electrically welded wire fabric is also in demand for concrete and similar work, in place of expanded metal. Electrically welded wire hoops are manufactured for use on sugar and other barrels and small wooden vessels such as tubs and pails; and flat hoops are being welded by this method, the welded joint replacing the riveted joint, the weld being as strong as the stock itself. The electric welding of chain links is coming into use, especially in the smaller sizes of the best qualities of chain, such as are used in cranes and hoists. The links are first formed and threaded into a continuous chain, which is then fed through a machine which thoroughly welds each link. The weld is made at the side of the chain instead of in the neck. Rings are also electrically welded in all sizes, and are claimed to be of superior quality for japanning and nickel plating. Screws, bolts, &c., are now made by welding the hexagon, round or square head to a round cold rolled steel shank on which the thread is cut. This method is especially adapted to the making of screws or bolts of extra or odd sizes, and has the advantage of having a harder thread than that made in stock which has been turned down. Automobile rims are generally electrically welded, and a large proportion of all the dash and fender frames made in this country are similarly welded. A large amount of work in carriage hardware, too, is electrically welded. The welding of rails in the streets is becoming more general. This work has been going on in the cities of Brooklyn, Buffalo and Rochester, N. Y.; Columbus, Ohio; Scranton, Pa.; in Worcester, Mass., and on the Boston & Northern system in Lowell, Lawrence and Haverhill, Mass. It is stated that there has not been found a defective weld in any of the work on new rails, and those occurring on old rails amount to only about 0.5 per cent., and are due to the presence at the end of the rail of bolt holes, from which in some cases emanate cracks which have a tendency to develop breaks. Tests have shown that the electrically welded joint has a higher conductivity than the rail itself, and from this fact it is claimed that it requires less power to operate a system on which the rails are welded. The process is about to be used in England and on the Continent, the success which has attended the use of the weld in the United States having attracted attention from abroad.

Notes from Mexico.

National Railways.

DURANGO, June 15, 1903.—The Government has taken another step in the direction of heading off railway mergers, and participating in the management of the lines of transportation. It will be remembered that control was recently obtained by the Government of the Interoceanic Railway, which connects the capital with Vera Cruz. An arrangement has now been made through New York bankers whereby the Government secures virtual control of the National and International systems also. These three railways aggregate more than 3300 miles of track in operation. The *Diario Oficial*, the Government organ, gives the following details of the transaction: "The Government has arranged with bankers of New York for the purchase of 253,655 shares of the National Railway Company of Mexico, a fact which, taken in connection with the mode of organization of that company, and that the bankers alluded to oblige themselves to procure the resignation of four of the directors of the National Railway Company, nonresident in Mexico, who will be replaced by persons designated by the Mexican Government, will give the latter an unquestioned control over the line in question, while at the same time the Government will continue to exercise control over the Interoceanic Railway, inasmuch as the Interoceanic shares which it bought will become the property of the National Railway, and as the Government will have control in the management of the latter, it is plain that it will have a like control over both, or, in other words, over a system of railroads extending from the Gulf of Mexico to the northern border of the republic."

An effective checkmate to corporation consolidation has thus been found in the form of a national railway trust. By the acquisition of this interest in the National Railway, which controls the International system, running from the border at Eagle Pass to the city of Durango, the Government becomes a potent factor in the transportation business of the country, and will be in a position to do a great deal in promoting its industrial development. While all the railways of the republic are in a sense under Government supervision, seeing that their passenger and freight rates are fixed by it, and cannot be changed without its sanction, the direct holding of a monetary interest in the railways themselves by the purchase of a large number of shares naturally fosters the idea that in the future the Federal influence will be exercised in the direction of pushing the extension of branches into those regions which lack transportation facilities, and of hastening the construction of important lines which have long been projected. A line from Durango to Mazatlan has been surveyed, located and resurveyed, but as yet nothing has come of it, with the exception of the building of a few kilometers of track from the Durango end. At present the International is landlocked, as it has been since its construction ten years ago, in this city. Large forests of merchantable timber and great mining deposits are situated between this point and the coast, for the most part valueless because of lacking transportation facilities. For years the merchants and manufacturers of Durango have been looking forward to the time when profitable trade relations would be opened up with Mazatlan and the Pacific Coast of the United States. When the cry for this expansion of business becomes more persistent than usual it is the custom of the management of the International Railway to start out a new surveying corps to resurvey an old route or to hunt for a new one. And there the matter rests. It has been humorously said that these surveying parties have gone over the route so often that if ever the line is constructed there will be keen competition for the grading contracts—the work will be so easy.

If the Government has gone into the railway business with the intention of making itself felt in the management, as is not improbable, the engineering department of the International system will, it is to be hoped, speedily feel an impulse.

A New York financial journal, commenting upon the Government's arrangement with the bankers in this transaction, remarks that it is the first instance of a Government entering into partnership with a private firm in railway ownership. This is an erroneous conclusion. It is well known in Mexico that the Mexican Government some years ago made a long time contract with the Pearsons of London for the operation of the National Tehuantepec Railway, an important line, which is destined to figure prominently as a competitor for transcontinental traffic before many years have passed.

Duty on Ferromanganese.

With the object of encouraging the manufacture of steel in the republic, the Government has reduced the import duty on ferromanganese containing 25 per cent. or more of manganese from $5 per 100 kg. to $1.50 per 100 kg., gross weight.

The Rains.

Rains have been general throughout the country. The initial downpour of the season in the district of which Durango is the center occurred upon the last day of May, since which there have been refreshing showers almost daily. On account of the large area of the republic subject to drought, and the inadequacy of existing irrigation systems, agricultural operations are virtually at a standstill until the opening of the rainy season, hence the coming of the rains is anxiously looked forward to by all classes. The humid season has begun early this year, and hope is general that a large area will be planted and a generous yield of maize, beans and the other staples crown the labors of the agriculturists.

Industrial Notes.

La Compania Explotadora de Maderas, at Guaymas, have been dissolved and succeeded by La Compania Industrial y Explotadora de Maderas. This corporation operate several industrial enterprises, including an iron foundry and machine shop in Hermosillo, the capital of the State of Sonora.

The various Chambers of Commerce throughout the country have petitioned the Government not to permit the railway companies to increase their tariffs. The transportation companies some time ago applied for permission to raise their rates in order to offset the loss suffered by them consequent upon the fall in silver.

A mining supply house in the capital has booked an order for 100 tons of corrugated roofing.

The discovery of a large body of iron ore suitable for steel making is reported as having been made near a station on the National Tehuantepec Railway. In connection with the find a Mexican daily announces that "a prominent iron and steel company have offered to contract for 300,000 tons per annum for ten years."

La Compania Metalurgia Belga, a Belgian company, as the name indicates, have opened an office in the city of Mexico. Railway supplies, bridges, building material, &c., are the lines in which the company will solicit trade.

The following pardonably optimistic news item appears in a Mexican trade journal: "It is reported from Monterey that the great iron and steel foundry have started up the steel making department, and that early in June the company will be ready to supply the demand and fill the many orders they have received. In fact, the company have made several contracts to supply steel in various forms, and have a traveling agent, who was in the city a few days since, prepared to make contracts for the delivery of structural iron and steel, and to contract for the supply of rails to any railroad in the country or projected railroad. He has closed one contract for 3000 tons of rails for one of the principal roads entering this city, for delivery from July 15. The company have obtained special freight rates over the railways for their pig iron, which will facilitate the exportation to Texas and other States north of the Rio Grande. The company also have an agent looking after orders in that region. In view of these facts it is evident that Mexico will soon make its own rails, and export iron and steel to the sister republic."

Among recent orders for rolling stock placed by Mexican railways in the United States are the following: With the American Car & Foundry Company, by the Mexican Central Railway Company, 150 box cars, of 60-

000 pounds capacity; with the Baldwin Locomotive Works, by the Mexican International Railway Company, five locomotives, for early delivery.

Consular representatives of the republic of Mexico will shortly be appointed in the trading centers of the empire of Austria-Hungary. This decision has been reached as a consequence of the increase in trade between the two countries since the renewal of diplomatic and friendly relations.

During the last half of the fiscal year 1901-1902 20,891 railway cars carrying 296,158 tons of merchandise entered Mexico from the United States.

The superiority of tools and implements of United States manufacture is now generally recognized. Hardwaremen of the Mexican capital give testimony to the effect that "American products in these lines are gradually taking the place of articles of British and German production. Agricultural implements, carpenters' and engineers' tools, builders' hardware, sanitary fittings and household furnishings are mentioned as among the articles in which American pre-eminence has become established in Mexico."

A $2,000,000 contract, covering the construction of a drainage and water works system in the city of Monterey, has been obtained by Joseph David of Cleveland, Ohio.

Peat fuel is being offered to the people of the capital by the Peat Industry Company, Limited. Twelve dollars, Mexican silver, per ton is the price quoted for the article.

Two new lines of steamships are to be established under Mexican auspices—one for the Atlantic Coast trade, the other to ply between this country and Central and South America.

President Diaz has asked the Governor of the State of Nuevo Leon to arbitrate the matter in dispute between the striking foreign glass workers in Monterey and their employers.

The Industrial Commissioners who have been traveling through Central and South America for six months past trying to open up markets for products of Mexican manufacture have returned. They report that their mission has been a successful one.

The Government has granted the Interoceanic Railway Company the privilege of importing free of duty the necessary machinery and material for the construction and operation of a creosoting plant for the treatment of the ties and timber to be used upon their line and proposed extensions. J. J. D.

Important Machinery Bids.

The following important items were among the bids for supplies for the Eastern yards opened June 9 at the Navy Department, Washington:

Bidder 1. Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.
2. Crocker-Wheeler Company, Ampere, N. J.
3. Falkenau-Sinclair Company, Philadelphia, Pa.
4. Charles Ross & Sons Company, Brooklyn, N. Y.
5. F. H. Woodruff & Son, New York.
6. Otis Livingston, New York.
7. Tinius Olsen & Co., Philadelphia.
8. Burnham, Williams & Co., Philadelphia.
9. Contractors' Supply & Equipment Company, Chicago: informal; no guarantee.
10. Babcock & Wilcox Company, New York.
11. The Thresher Electric Company, Dayton, Ohio.
12. J. B. Kendall, Washington, D. C.
13. H. K. Porter Company, Pittsburgh.
14. Challenge Machine Company, Philadelphia.
15. Wilmarth & Morman Company, Grand Rapids, Mich.
16. George A. Ohl & Co., Newark, N. J.
17. Brown & Sharpe Mfg. Company, Providence, R. I.
18. Springfield Machine Tool Company, Springfield, Ohio.
19. Becker-Brainard Milling Machine Company, Hyde Park, Mass.
20. Hill, Clarke & Co., Boston.
21. J. C. M. Lucas, Baltimore, Md.
22. Garvin Machine Company, New York.
23. Holtzer-Cabot Electric Company, Boston.
24. Detrick & Harvey Machine Company, Baltimore, Md.
25. Jones & Lamson Machine Company, Springfield, Vt.
26. Rahn-Myer-Carpenter Company, Cincinnati.
27. Riehle Brothers Testing Machine Company, Philadelphia.
28. Hendey Machine Company, Torrington, Conn.
29. James Clark, Jr., & Co., Louisville, Ky.
30. American Tool Works Company, Cincinnati, Ohio.
31. Bentel & Margedant Company, Hamilton, Ohio.
32. American Locomotive Company, New York; informal; no guarantee.
33. Williams, White & Co., Moline, Ill.
34. American Machinery Company, Grand Rapids, Mich.
35. Edwin Harrington, Son & Co., Philadelphia.
36. Niles Tool Works Company, Hamilton, Ohio.
37. Prentiss Tool & Supply Company, New York.
38. Levi Best, New York; informal: no guarantee.
39. Gleason Works, Rochester, N. Y.
40. Montgomery & Co., New York.
41. I. H. Johnson, Jr., & Co., Philadelphia.
42. Manning, Maxwell & Moore, New York.
43. George Place, New York.
44. Drew Machinery Agency, Manchester, N. H.
45. E. A. Temple, New York.
46. W. H. Foster, New York.
47. B. F. Sturtevant Company, Boston, Mass.
48. Western Electric Company, New York.
49. Manhattan Supply Company, New York.
50. R. W. Geldart, New York.
51. Bement, Miles & Co., Philadelphia.
52. S. A. Woods Machine Company, South Boston, Mass.
53. Smith-Courtney Company, Norfolk, Va.
54. General Electric Company, Schenectady, N. Y.
55. John F. Riley, Charleston, S. C.
56. Gould & Eberhardt, Newark, N. J.
57. Niagara Machine & Tool Works, Buffalo, N. Y.

Class 1. Five 15, six 10 and one 7½ horse-power electric motors.—Bidder 1, $3475; 44, $4400 and $3768; 23, $4091.50; 2, $4526; 47, $4700; 48, $4708; 11, $4825; 54, $5900; 21, $6200.

Class 2. One 10, one 2, one 5, three ½, one 3, one 15 and one 5 horse-power electric motors.—Bidder 11, $1956; 44, $2124; 47, $2140; 1, $2240; 2, $2305; 23, $2481.50; 54, $2435; 21, $3500.

Class 5. One 8 inch x 14 foot and one 4 inch x 14 foot portable cylinder boring bars.—Bidder 44, $1633 and $1546; 42, $1635; 36, $1820.

Class 6. Three 52 horse-power water tube steam boilers.—Bidder 10, $3877.

Class 7. Electrically driven 10-foot automatic power brake.—Bidder 16, $2700.

Class 11. Universal radial drill.—Bidder 36, $1300; 42, $1625.

Class 15. Horizontal boring and drill machine.—Bidder 37, $2215; 51, $2592.

Class 29. Two 16-inch engine lathes.—Bidder 44, $682; 20, $898; 26, $930; 30, $950; 37, $1010; 22, $1016; 41, $1019; 42, $1232 and $1026; 18, $1184; 28, $1190.

Class 30. Two 24-inch engine lathes.—Bidder 30, $1590; 37, $1600; 18, $1622; 22, $1820; 42, $1860; 26, $1970; 41, $1934; 28, $2186.

Class 38. Triple back geared hollow hexagon turret lathe, with 16-inch swing.—Bidder 25, $1300; 36, $1380; 42, $1405; 53, $1649.

Class 39. Double turret lathe, with 22-inch swing.—Bidder 46, $1916.

Class 40. Two 16-inch lathes, electrically driven.—Bidder 18, $1670; 35, $1710.

Class 41. Twenty-eight-inch extension lathe.—Bidder 35, $2250.

Class 43. Two pattern makers' gap lathes.—Bidder 42, $1995.

Class 44. Saddle tank locomotive of standard make.—Bidder 8, $4850; 33, $5418.

Class 46. Pipe machine.—Bidder 53, $725; 42, $1150; 40, $1160; 49, $1174; 44, $1208 and $1133.

Class 47. Universal milling machine.—Bidder 42, $1188; 19, $1395; 17, $1420; 37, $1440; 44, $1584.66.

Class 49. Combined horizontal punching and beam bending machine.—Bidder 42, $1688; 36, $2183.

Class 51. Testing machine, 800,000 pounds capacity, swinging traveling crane, hydraulic link cutter, set steel grippers, 20 horse-power motor.—Bidder 3, $12,940; 7, $13,175; 27, $25,000.

Class 61. Electrically driven hammering machine.—Bidder 16, $2450.

Class 63. Cold saw cutting off machine.—Bidder 36, $1465.

Class 65. Concrete mixer, complete with engine and boiler.—Bidder 5, $1059; 44, $770, $925 and $781; 49, $2270; 50, $684 and $789.

Class 68. Triple back geared slip roll.—Bidder 57, $756; 16, $900; 36, $1200.

Class 71. Dimension planer.—Bidder 43, $1460.

Class 72. One 30 x 30 inch x 10 foot metal planer.—Bidder 37, $1395; 20, $1530; 42, $1636; 36, $1780.

Class 73. One four-roll single surface planer.—Bidder 52, $1020; 43, $3110.

Class 74. Twelve-inch automatic beveled gear planer.—Bidder 39, $1200.

Class 81. One 24 x 24 inch blanking press, with motor.—Bidder 37, $1075; 16, $1250; 44, $1670.

Class 82. One 48-inch power gap punch, with motor.—Bidder 16, $1200; 36, $2241; 37, $1575.

Class 90. Thirty-two-inch shaper.—Bidder 42, $704; 56, $1530.

Class 92. One 10-foot power shear, with motor.—Bidder 57, $1435; 44, $1825 and $3320; 16, $1660; 36, $2820.

Class 94. Open throat cross cut bar shear.—Bidder 37, $1375; 33, $1575; 42, $2066.

Class 98. One steel plate gate shear, 24 inch depth of gap, and one 30-inch gap.—Bidder 36, $6934; 42, $7200; 33, $9455.

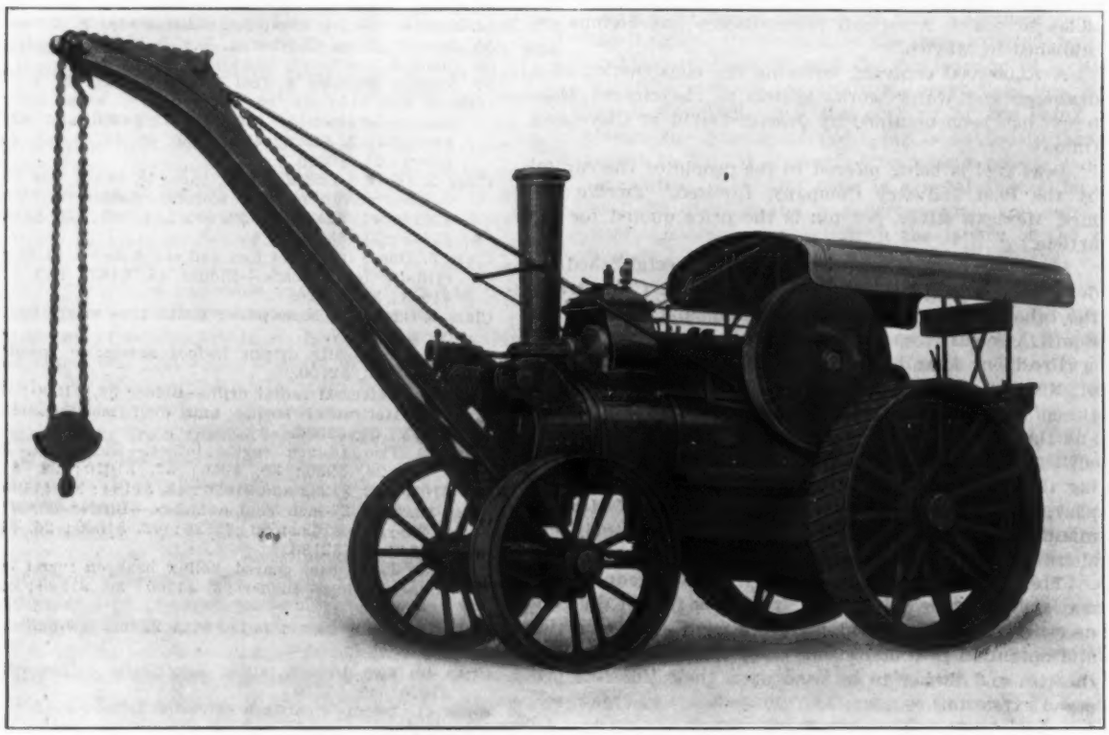
An English Traction Engine Crane for St. Louis Fair.

Prominent among the foreign exhibits to be made at the Universal Exposition at St. Louis will be two compound spring mounted road locomotives fitted with jib cranes, one of which is herewith illustrated. Aside from the mechanical features of these traction cranes, and their importance from an engineering standpoint, they are the center of considerable popular interest because of the service of this type of crane engine in South Africa during the Boer War. Besides being installed in the Exhibitors' Power Plant during the exposition, these cranes are to be subjected to a thorough practical test in the installation of machinery exhibits during the preparatory period of the fair. These traction cranes, which are capable of lifting loads up to 10 tons, come from the steam plow and locomotive works of John Fowler & Co. (Limited), Leeds, England. This type of locomotive has been manufactured by Fowler & Co. for many years, and several of the cranes have been in constant and successful operation at the works of the firm, but from time to time numerous improvements have been made in both engines and cranes. The engines are now fitted with laminated springs of the railway locomotive type, materially lessening the jar and vibration on roads and decreasing the wear and tear throughout the machine. Engines of this type possess among other features safety and rapidity of manipulation and the possibility of dismounting the lifting apparatus when desired. These crane engines are now manufactured to lift anything from 500 pounds up to 10 tons.

The lighter weights are negotiated by a quick speed slewing crane, the hoisting being done by a bollard and rope on the crank shaft. The heavier weights are raised by a geared crane, the jib being mounted at the front of the engine, the hoisting gear and brake being controlled by the driver from his position on the foot plate. This arrangement enables the engine to lift a load and travel with it, and by the steerage gears loads can be handled in awkward places, where an ordinary crane could not be used. The Fowler system of applying cranes to road locomotives does not decrease their usefulness for hauling purposes. For short journeys and in works there is no need to remove the crane; but for long journeys, haulage or temporary belt driving the crane attachment can be easily dismantled if necessary.

In order that no time may be lost in changing motions, the crane barrel is driven independently of the road motion by a special arrangement of gears and clutches. Safety during suspension, without special attention, is secured by suitable gearing. The absence of dangerous trolleys, the reduction in labor, the minimizing of risk of accident, the economy of space and the saving of time in handling loads are among the advantages of this engine, which is largely used in locomotive works and other manufactories.

For use in connection with the traction engine cranes, the builders purpose sending a number of cars; these in order to increase the range of usefulness, as the cranes can transfer machinery, statuary and other items from the railways cars to the traction train and then, reverting to the original function of traction engines, can haul this train to the point or points of delivery and there transfer the machinery to the foundations prepared for it, or the statuary to the pedestals prepared for its reception. The second engraving shows one of these engines attached to two transport cars and two mounted rifles.



AN ENGLISH TRACTION ENGINE CRANE FOR ST. LOUIS FAIR.

A superintendent of a factory sent an order, accompanied by two cold rolled shafts, to a machine shop, reading as follows: "Cut 2 feet off of the ends of each of these shafts." When the foreman of the machine shop received the order he said to himself that the man who wrote it did not mean what it said; nevertheless, he proceeded to obey the order literally, and cut 2 feet off of the ends of both shafts, which, of course, left them 4 feet shorter than they were originally. The shafts were returned, and in due course the superintendent appeared demanding to know why the order he sent was not followed. The foreman asserted that it had been, and told the superintendent that there were two ends upon each shaft, a fact which he had overlooked, adding that the order was not properly made out; it should have read: "Make each of these shafts 8 feet long," which would have left no room for misapprehension. When the Panama Canal was in process of construction a large number of bolts of a certain size were required. To prevent the possibility of error in the size a wooden model was constructed and sent to France, with orders for 2,000,000 bolts "exactly like the model;" in due time the quantity demanded came, all made of wood, which was handy for kindling fires only. In giving orders,

however simple, it does no harm to scan them closely to see if they are capable of being misconstrued.

The Columbia Electric Five-Ton Truck with Four-Motor Drive and Electrical Steering.

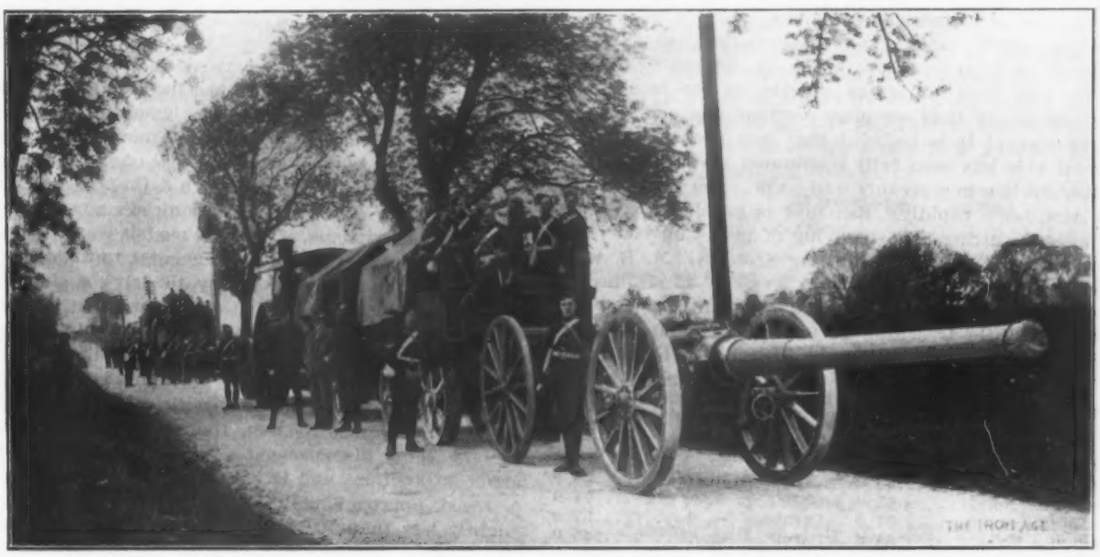
The new Columbia electric 5-ton truck made by the Electric Vehicle Company of Hartford, Conn., presents marked advances over large self propelled vehicles of previous types, in that it exemplifies the first commercially successful attempt to apply power to all four wheels and to steer by other than manual power. The general lines of the construction of the vehicle proper follow quite closely standard horse truck construction of the well-known New York gear type. The large fifth wheel at the front permits the front axle and wheels to be swung at right angles to the body, giving a very short turning circle and permitting the vehicle to be turned around in a space which is practically of its own length. All four wheels are alike and of the standard Sarven type, mounted on very large roller bearings.

Four motors are used for driving, one for each wheel. These are suspended directly from the body of the vehicle and transmit power to the wheels by heavy roller chains. The wheel sprockets are bolted directly to the spokes, giving a simple but strong construction. Chain adjustment is provided by a powerful strut between the axle and the motor. This is so made as to allow for working and twisting of the body without any twist being imparted to the strut.

The front truck is steered by means of an electric motor. A very large, broad faced steering sector is carried by the truck. This sector meshes with a large pinion at the lower end of a short thick vertical shaft, at the upper end of which is a worm gear driven by a worm on a short shaft, which can be clutched to the steering motor or not, as desired. This arrangement affords a rigid back lock, holding the wheels securely wherever the motor leaves them. In order to give perfect steadiness of steering, especially when coasting or when little power is required, a solonoid released brake is put on the armature shaft to stop its rotating instantly the power is turned off. This simple device makes it possible to run the truck as fast as 18 miles per hour and hold a perfectly true course. When the front truck is swung at right angles to the body it automatically cuts the power from the rear wheel motors, this arrangement preventing the front tires from being shoved sidewise when the vehicle is turned in a short circle. The steering motor is controlled by a short tiller placed immediately above the main controller. It is so adjusted that if it is swung through, say, 15 degrees, the front truck swings through the same angle and then comes to rest. The direction of the tiller is always indicative of the direction of the progress of the vehicle. Means are provided to steer the truck by hand in case of accident to the motor or battery. The truck is provided with a powerful winch operated by the steering motor when it has been unclutched from the steering gear and coupled to the clutch gear. This change can be quickly made by the operator.

The battery consists of 44 exide cells of 280 ampere hours' capacity, arranged in a tray hung below the body. The battery can be readily removed by one man, although it weighs 3500 pounds. A new method of battery suspension from three points has been introduced in this vehicle. With so large a truck, having a platform approximating 6 x 16 feet in dimensions, it is naturally difficult to keep it perfectly flat at all times when it is in service, and by means of this suspension all warping and twisting of the battery is eliminated, which could not be the case if it were suspended from four points. The usual Columbia automatic contacts are used on the tray, simplifying the work of loading and unloading batteries. The controller is of the vertical pattern, giving four speeds forward, an electric brake and three reverse speeds. The electric brake works on all four wheels and thus prevents skidding. A powerful foot operated expanding brake works directly on the rear wheel sprockets. This is a wood faced brake arranged for easy adjustment to wear. The largest solid tires made are used, and, as power is applied equally to all four wheels, not only is the driving strain per tire reduced 50 per cent., but the actual weight carried per tire is greatly reduced, inasmuch as only 50 per cent. of the total weight of the truck need be supported on each axle, whereas with the two-motor drive from 60 to 70 per cent. of the weight must be carried by the driving axle.

This truck is especially designed for heavy traffic in crowded centers. The fact that it can be swung entirely around in its own length in from five to ten seconds does away with all the backing and filling which has proved so tedious to operators of heavy hand steered trucks and which involves great wear on tires and mechanism.



TRACTION ENGINE HAULING TWO TRANSPORT CARS AND TWO MOUNTED RIFLES

The Westinghouse Electric & Mfg. Company record that in one instance where 30 steam engines, of 1375 total horse-power, were supplanted by 57 motors, of 1065 total horse-power, for machine shop driving, the average daily saving in steam was 41.6 per cent., of combustibles 32.2 per cent. (coal saved 20,000 pounds). In other cases electric driving has reduced by 50 per cent. the cost for engineer, coal and water; the fuel account, 20 per cent.; the cost of power, 44 per cent. The gross saving was 30 per cent. with direct connected motors and 22 per cent. with belted or geared motors.

Industrial Affairs in Scotland.

The Iron Market.

GLASGOW, June 11, 1903.—The advices from America this week are considered more favorable in iron circles, and as a consequence warrants recovered a few pence; but the improvement was trifling and the transactions were unimportant. Three orders for Cumberland hematite have within the last few days been received from your side, one for 4000 tons, one for 1500 tons and one for 500 tons, and these are taken to indicate that you are still unable to do altogether without British iron of some sort, although cables report that your output is at top and that finished material is easier. There is no improvement in our markets for finished iron and steel, and prices, if anything, are lower; yet smelters maintain their prices for pig iron irrespective of the fluctuations in warrants.

In warrants the transactions now seldom exceed 10,000 tons per day, chiefly of Cleveland quality, and are often much below these figures. But, after all, at the end of May, when the storage accounts were made up, there were only 15,000 tons in the Glasgow stores, with warrants in circulation for 15,000 tons, and 143,440 tons in the Middlesbrough stores, with warrants in circulation for 131,400 tons. The entire public stock in the United Kingdom is now under 180,000 tons, which I take to be equal to about three days' consumption in America. Smelters hold no stocks to speak of, having to deliver against contracts almost as quickly as the iron cools. The position is thus certainly curious. In one section of our market it is believed that any probable relapse on your side has been fully discounted here and that no further decline in warrants will occur, even if your markets run down rapidly. But that is problematic, while the alleged cutting and steadying of prices on your side are puzzling. At time of writing Scotch G. M. B. warrants are 52 shillings 3 pence, Cleveland 45 shillings 9 pence and Cumberland hematite 57 shillings 7 pence. Scotch hematite is selling at 62 shillings and Middlesbrough hematite at 58 shillings 6 pence, both delivered to local steel works. The following are current quotations for Scotch makers' iron, f.o.b. Clyde:

	s. d.		s. d.
Coltness No. 1	72 6	Langloan No. 3	59 6
Coltness No. 3	59 0	Clyde No. 1	63 0
Gartsherrie No. 1	63 6	Clyde No. 3	57 0
Gartsherrie No. 3	57 6	Carnbroe No. 1	57 0
Summerlee No. 1	68 6	Carnbroe No. 3	55 0
Summerlee No. 3	58 6	Monkland No. 1	56 6
Calder No. 1	63 6	Monkland No. 3	54 6
Calder No. 3	...	Govan No. 1	...
Langloan No. 1	70 6	Govan No. 3	...
Eglinton No. 1	57 6	Glengarnock No. 1	63 6
Eglinton No. 3	54 0	Glengarnock No. 3	57 0
Dalmellington No. 1	57 6	Dalmellington No. 3	54 0
Shotts No. 1	66 0	Shotts No. 3	58 0
Carron No. 1	66 6	Carron No. 3	58 0

Shotts iron is delivered at Leith, Carron iron at Grangemouth.

Iron and Steel Exports.

The exports of pig iron in the past month have been remarkably good, totaling 104,022 tons, as compared with 81,818 tons in the corresponding month of last year. The following table shows the destination of the pig iron exported in the month of May, 1903, as compared with May, 1902:

	May, 1902. Tons.	May, 1903. Tons.
Sweden	6,508	4,877
Germany	11,952	15,676
Holland	4,520	5,378
Belgium	4,144	4,658
France	4,338	6,279
Italy	11,008	12,707
United States of America	23,177	35,722
Other countries	16,171	18,725
Totals	81,818	104,022

The following table shows the exports of pig iron from the United Kingdom to the United States of America during the past five months of the current year, the monthly figures for the past two years being also given for the purpose of comparison:

	1903. Tons.	1902. Tons.	1901. Tons.
January	49,946	7,134	851
February	19,788	2,708	2,133
March	79,897	14,845	1,829
April	34,840	7,720	4,130
May	35,722	23,177	4,651
June	....	26,319	6,497
July	....	52,192	3,293
August	....	69,970	4,563
September	....	69,227	5,408
October	....	55,003	3,014
November	....	79,564	4,507
December	....	88,541	3,397
Totals	220,193	497,000	44,283

The three heaviest months, it will be seen, were November and December, 1902, and March, 1903.

Of rails our May exports were 82,922 tons, as compared with 69,825 tons in May of last year, and iron and steel manufactures generally increased from 299,166 tons to 349,120 tons.

Of our imports of pig iron only 726 tons in the month and 1562 tons in the five months were from the United States, whereas in the first five months of 1902 and 1901 the quantities were 5907 tons and 2682 tons, respectively. Our entire imports of foreign pig iron last month were only 9126 tons.

Shipbuilders Consolidating.

The shipbuilding combine between C. S. Swan & Hunter, Limited, and Wigham-Richardson & Co., Limited, both near Newcastle-on-Tyne, is to be followed up by a further combination between these two firms and the Wallsend Slipway & Engineering Company, Limited. The immediate object of this amalgamation is to secure a contract for one of the two new Cunard monsters.

It is now a practical certainty that one of these vessels will be constructed by John Brown & Co., Limited, Clydebank, Glasgow. The design has required many conferences and some experiments. The first models were thoroughly tested at the Government experimental tank, and it was found that the power necessary to drive a ship of the dimensions given at the high speed set down in the conditions of the contract was almost prohibitive. The model experiments have all been in the direction of increasing the beam. Originally 76 and 78 feet were laid down in the designs, but now with a length of 760 feet the width is to be 85 feet, thereby reducing resistance for the same displacement. This displacement will be about 35,000 tons, and it is expected that on a trial trip a speed approaching 26 knots will be realized with slightly less than 70,000 indicated horse-power, while on the Atlantic 25 knots will be maintained with 65,000 indicated horse-power.

The great beam militates against an order going to the Vickers Company at Barrow-in-Furness, as the locks or entrances to the fitting out basin there are too narrow for the new design of ship; but on the Clyde and Tyne there will be no difficulty whatever. Conferences are now in progress between the officials of the Cunard Company and of John Brown & Co., Swan & Hunter and the Wallsend Company, with the view to the preparation of the necessary details so as to insure that the two ships will be in all respects duplicates. These ships will excel all others—in length by 60 feet, in beam by 10 feet, in displacement by 5000 or 6000 tons, in horse-power by 23,000 indicated horse-power and in prospective speed by nearly 2 nautical miles per hour.

The Shrinkage in the Warrant Trade.

A striking incident of the trade of this district is the resolution of Connal & Co., Limited, the owners of the famous pig iron stores, to sell a large portion of the land which has been hitherto devoted to the storage of pig iron. This house have been in existence for about 60 years, formerly as a private firm and since 1896 as a limited liability company. In former days the ironmasters used to accumulate iron in their yards and, when necessary, obtain advances from the banks on security of the stocks. But as the business grew in magnitude it required the creation of negotiable securities, and Connal & Co. became the custodians, with such repute for integrity that their warrants acquired all the value of bank notes.

Begun in a comparatively small way, the stock in Connal's, lodged by makers and converted into warrants, was in 1853 216,000 tons. It rose to 760,000 tons in 1863, dropped to 96,000 tons in 1874, and rose steadily thereafter until as much as 1,244,433 tons were stored in 1888. From that time it has come down year by year until now there are only 15,000 tons in the Glasgow stores. Naturally a storage capacity equal to 1,500,000 tons is wasted on 15,000 tons, and Connal & Co. propose to sell the surplus land and with the proceeds pay off their preference shareholders, who represent about £170,000. With the reduced stocks the profits during the past two years have not been sufficient to pay the 4 per cent. dividend on these shares.

Notes.

It is remarkable how our exports of coal are maintained, notwithstanding the reputed languid demand from abroad and the evident lethargy of the markets at home. The total last month was 4,413,595 tons, as compared with 3,865,311 tons in the corresponding month of last year. It would seem that the American demand for our coal has not ceased, since 43,239 tons were shipped to the United States in May, making a total of 1,064,382 tons for the five months.

There has been some uneasiness in the Scotch iron trade owing to labor disputes with the blast furnacemen, which have for some weeks past threatened the blowing out of furnaces. So far a deadlock has been averted, but the friction is not yet all removed.

Smelters are now getting fuel very cheap and ore is being imported at a lower cost. A few days ago a cargo of 5000 tons arrived in the Clyde from Wabana, the first of the season and the first of a contract for 80,000 tons to be delivered during the season.

Although the finished iron trade is dull, the bimonthly audit of the Board of Conciliation requires no change in the wages of the workmen, the net average realized price at the works in March and April being £6 5s. 1d. per ton. The malleable iron combine, although practically completed, has not yet been publicly announced.

The stoppage this week of the old established Mossend Steel Works is a feature in the Scotch trade. The works are among the oldest of the kind in Lanarkshire, having been founded nearly 70 years ago by the late William Neilson, brother of the inventor of the hot blast. The cause of the stoppage has not yet been publicly made known, but it is not due to lack of orders, as the works have until quite recently been kept almost fully employed. Steel was first made at the Mossend Works in 1880 by the Siemens process in five furnaces. There were at the time of closing a dozen 40-ton furnaces, with gas producers of the Siemens and Wilson types. The output consisted chiefly of ship plates, boiler plates, plates for structural work and sections for shipbuilders. The local production of steel ship plates will thus be appreciably reduced. B. T.

A German Gas Engine Association.—The most recent combination is the Association of Gas Engine Makers of Germany, the formation of which was completed at the end of May. It comprises at present 16 works, of which nine are situated in Rhenish-Westphalia, and it includes the firms of Körting Brothers of Hanover, A. Borsig of Berlin and the Donnersmarck Iron Works, the headquarters of the association being located at Nuremberg. The object of the combination is to regulate prices and secure uniformity in the condition of delivery in the case of contracts, and particularly in regard to guarantees. Although the scheme has been under consideration for several months, it was thought as recently as the beginning of May that it would be impossible to arrive at an agreement owing to the variety of interests and the difference in construction represented by the works. The actual constitution of the association indicates, however, that these difficulties have been successfully overcome, and the arrangement which has been entered into will be binding upon all the members in the preparation of tenders and estimates. Apart from the sphere of activity of the association, the fact should be mentioned that certain German gas engine makers are drawing special attention to the economy realized by the use of blast furnace gas in substitution for coal. The superiority claimed for the one system over the other has apparently alarmed some of the boiler and engine makers, who, at a meeting held recently at Cologne, submitted that the low fuel cost attributed to blast furnace gas engine plants is calculated to deceive consumers. They therefore decided to collect data on the subject, in order to show that steam is still the cheapest source of power, and if the figures are published the information should certainly be of an interesting character.

Recent Drawback Allowances.

Following are among the decisions of the Treasury Department which have been made public the past week:

Tubular Cream Separators.

The regulations of May 12, 1903, in the matter of drawback on tubular cream separators manufactured by P. M. Sharples of Westchester, Pa., in part from imported pig iron, are extended, as far as applicable, to similar manufactures of different sizes and percentages of pig iron. In liquidation, the quantity of imported pig iron which may be taken as the basis for allowance of drawback may equal the quantity used, as declared in the drawback entry, with an addition of not more than 5 per cent. to compensate for the nonrecoverable loss in manufacture. Such allowance shall not exceed the following for the different size separators: Nos. 5, 7 and 10, 76 pounds of imported pig iron; Nos. 25 and 32, 156 pounds of imported pig iron.

Wire Rope.

The regulations of December 11, 1891, and August 1, 1896, in the matter of drawback on wire rope made in part from imported wire, are extended, as far as applicable, to wire rope designated as "Monarch" and "Plough," manufactured by the Macomber & Whyte Rope Company of Chicago, Ill., in part from imported wire. The manufacturing records must show the amount of wire imported, the amount used in manufacture, the weight of the reel upon which the rope in its completed form is wound, and the weight of the domestic jute core and the lubricant used in the manufacture.

Armored Cable.

The regulations of July 25, 1891, in the matter of drawback on insulated electric lighting cables manufactured by the Norwich Insulating Wire Company of Brooklyn, N. Y., in part from imported lead, are amended so as to provide for drawback on galvanized wire produced from imported steel billets used in armoring cables manufactured and exported by the National Conduit & Cable Company of New York City, successors of the Norwich Insulating Wire Company.

Steel Barrel Hoops.

On the exportation of barrels manufactured by the Standard Oil Company (Bayonne, N. J., works), with the use of steel hoops made by the Sharon Steel Hoop Company of Sharon, Pa., from imported steel billets, a drawback will be allowed equal in amount to the duty paid on the imported material used, less the legal deduction of 1 per cent. An allowance may be made of not more than 2 pounds as unrecoverable waste for every 100 pounds of imported material consumed, and for valuable waste in proportion to the value of such waste at the time of manufacture and the price paid at the works for the imported material. The regulations of August 23, 1902, on the same matter are revoked and the foregoing substituted.

Horse Nails.

The regulations of July 11, 1902, establishing a rate for allowance of drawback on horse nails manufactured by the Capewell Horsenail Company of Hartford, Conn., wholly from imported Swedish steel nail rods, are extended, as far as applicable, to similar manufactures by W. M. Mooney & Co. of Ausable Chasm, N. Y.

The Wallace Supply Company, Chicago, manufacturers of hand power angle and eye bending tools, have moved their offices from 56 Fifth avenue to 169 Jackson Boulevard.

The Illinois Steel Company Expansion.

The plans of the Illinois Steel Company for new construction and improvements at the South Chicago Works have progressed sufficiently to make known some of the details of the new plants, which, with the construction and improvements at Joliet and at the North Works of the company, will involve an expenditure of upward of $8,000,000. Active construction work began a few days ago. With the exception of the cement plant—which will be built 9 miles from South Chicago—all of the new buildings will be located on the company's property at South Chicago, north of the existing works. The new construction at the South Works will consist of an open hearth plant, a blooming mill, a universal plate mill and an electric power plant.

New Open Hearth Plant.

The open hearth plant will consist of a main building, 125 x 562 feet; a lean-to, 32 x 562 feet; a gas producer building, 33 x 562 feet, and a refractory plant, 40 x 140 feet. The plant will be built with an equipment of seven 50-ton open hearth furnaces, and provision made whereby this number of furnaces can be conveniently increased from time to time. The fuel used will be producer gas, manufactured by producers built by the Morgan Construction Company of Worcester, Mass. The charging machinery will be of the latest type, built by the Wellman-Seaver-Morgan Company of Cleveland, Ohio. The two casting cranes will be of 100-ton capacity, and all ingots will be cast on cars. The tonnage of the open hearth furnaces will be, approximately, 25,000 tons of ingots per month. The ingots from this mill will be delivered to the blooming mill, which will supply a structural mill suitable for angles, flats and beams up to 15 inches.

Blooming Mill Plant.

The blooming mill plant will consist of the following group of buildings: Soaking pit, 75 x 270 feet; blooming mills, 80 x 130 feet; main building, 56 x 400 feet; structural mill, 40 x 200 feet, and hot bed building, 120 x 200 feet. The blooming mill will be a 40-inch mill, built by the United Engineering & Foundry Company of Pittsburgh, Pa., and driven by a pair of 55 x 60 inch direct connected engines, built by the Mesta Machine Company of Pittsburgh, Pa. The capacity of this mill will be about 20,000 tons of billets and blooms per month.

Structural Mill.

The structural mill will be in line with the blooming mill, from which it will receive its supply of steel, and will have four stands of rolls driven by two engines. The tables will be of the type in use by mills of similar character, and the general arrangement of the mill will follow that of the Pencoyd works of the American Bridge Company. The exact dimensions of the structural mill have not yet been fully determined upon.

Universal Plate Mill.

The universal plate mill will consist of the following group of buildings: Heating furnace building, 100 x 140 feet; main building, 90 x 680 feet; boiler house, 48 x 610 feet; two gas producer buildings, 33 x 240 feet and 33 x 100 feet. The 48-inch universal plate mill will parallel the blooming and structural mills, and common boiler and gas producer houses will serve both mills, both houses being fitted with coal and ash handling machinery. The 48-inch mill proper will be built by the Mackintosh-Hemphill Company of Pittsburgh, Pa., and will be driven by a pair of 50 x 60 inch direct connected reversing engines, built by the Mesta Machine Company of Pittsburgh, Pa. This mill will have a capacity for rolling plates from 14 inches wide up to 48 inches, and from ¼ inch thick up to 2 inches; and the ultimate capacity and tonnage will be, approximately, 16,000 to 18,000 tons of plates per month.

The Cement Plant.

The cement plant will consist of a raw material building, 155 x 180 feet; a burner building, 123 x 243 feet; a finishing building, 85 x 216 feet; store room and machine shop, 40 x 200 feet; bag house, 40 x 100 feet; electric transformer building, 40 x 40 feet; office and laboratory, 40 x 72 feet; coal crushers, 26 x 45 feet, and stock house, 100 x 780 feet. The 16-kiln, 4000-barrel cement plant will be located on property recently purchased by the Illinois Steel Company about 9 miles from South Chicago, but will be under the management of the South Chicago plant. This mill will use the granulated slag produced at the furnaces of the Illinois Steel Company for the base for the cement, and will embody the best points of the latest efforts of the various cement manufacturers of the country. The plant will be electrically driven from a station which is building at the South works of the Illinois Steel Company proper, and will be equipped throughout with alternating current machinery.

Electric Power Plant.

The location of the electric power plant will be one that will permit of using all of the available gas from the blast furnaces at the South Works for steam generating purposes. The plant will consist of an engine room, 58 x 118 feet, and a boiler house, 82 x 108 feet. The equipment will consist of two 2000 kw. Westinghouse alternating generators, driven by twin horizontal vertical Allis engines.

Minor Improvements.

The minor improvements at the South Works consist of various changes which will increase the capacity of the Bessemer department, approximately, 10,000 tons of ingots per month; addition to the soaking pit capacity of the rail mill to take care of the increased tonnage; addition to the present foundry, and some few slight changes in the finishing end of the 132-inch plate mill. The improvements will probably increase the number of men on the roll at the South Works by about 2000.

An Italian Steel and Shipbuilding Trust.

The fact that the trust fever has at last reached Italy, although in a somewhat mild form, should not in any way excite surprise, in view of the example set in this direction by certain other countries. The London *Engineer* reports that negotiations on the subject have been proceeding for some time past, and the end of May has witnessed the approval of an important scheme of amalgamation or establishment of a community of interests between certain of the principal iron and steel and shipbuilding works in Italy for the purpose of making further endeavors to emancipate the country from the need for external supplies, although the absence of coal beds considerably hampers the nation in its efforts to develop the native manufacturing industries. The undertakings concerned in the present scheme form two groups, one of which is composed of the Terni Steel Works Company, the shipbuilding yards of Orlando Brothers of Leghorn, Nicolaus Odero of Sestri Ponente and the Ligure-Anconitana of Ancona, while the other is represented by the Italian Metallurgical Company of Savona, the Raggios Iron Works and the Elba Iron Works Company. A few details respecting some of these enterprises may be of interest.

The Terni Steel Company, who have a share capital of £640,000, produce rails, guns and armor plates, the latter being supplied to the Italian navy, on the Harvey system. In addition to these manufactures the company own iron ore mines in Lignite, and a smaller mine with blast furnace at Valtrompia. A dividend at the rate of 16 per cent. was paid in 1902, as compared with 15 per cent. in each of the three preceding years. The Italian Metallurgical Company of Savona, who operate a foundry, steel works and rolling mills, arose from the ashes of the Tardy & Beuch Company. On the failure of the latter, the Terni Steel Company purchased the works from the liquidator and sold them to the Metallurgical Company, which they, in conjunction with others, formed specially for the purpose. The Savona enterprise, who have a share capital of £360,000, were unable to declare any dividend during the first year of their existence—namely, 1900-1901—but for 1901-1902 a distribution at the rate of 6 per cent. was made. The Elba Iron Works Company, who are also a recent creation, were formed in 1890 by the Italian Credit Bank (Credito Italiano) and the Creusot-Schneider Works. They exploit iron stone at Portoferraio, on the Island of Elba, and have one blast furnace in operation and

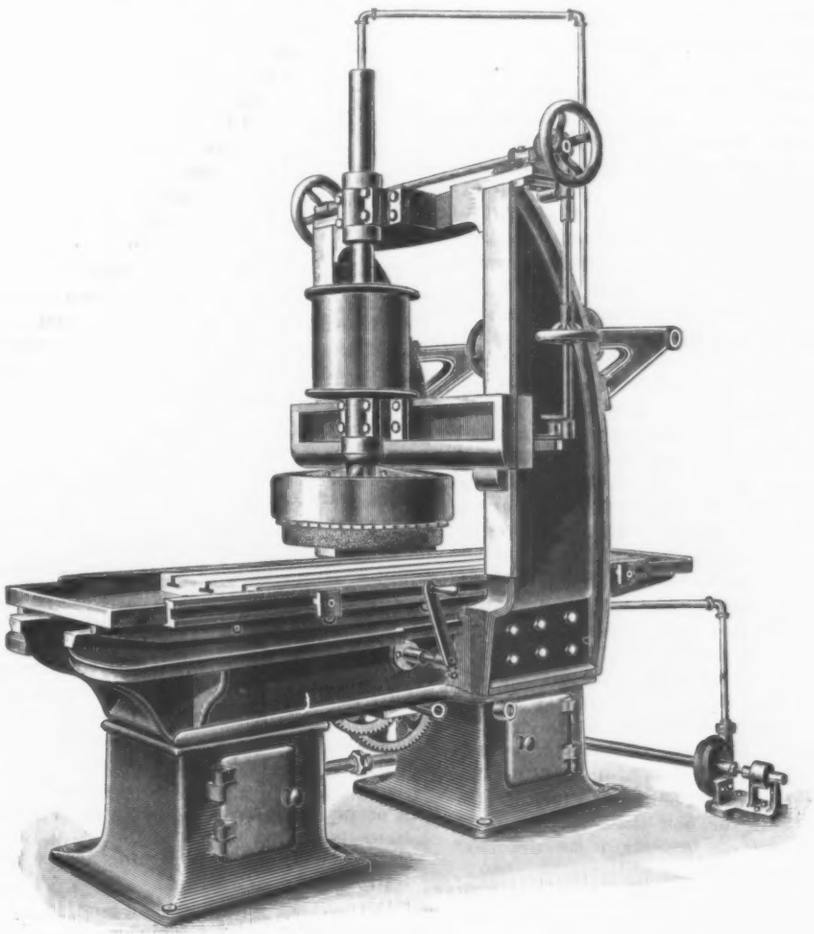
two others in course of construction, and they also own 104 coke ovens. The company have a share capital of £600,000, upon which a dividend at the rate of 3 per cent. was paid for 1902, as compared with 5 per cent. in the previous year. The reduction in the dividend is attributed to the large expenditure out of revenue for the purpose of extending the company's equipment.

Coming now to consider the scheme of amalgamation, we find that the shareholders in the Terni Steel Company have just sanctioned an increase in the share capital from £640,000 to £1,280,000, and also authorized an issue of bonds to the extent of £640,000 for the purpose of purchasing the before mentioned three shipbuilding yards, the four enterprises thus forming the first group. On their part, the shareholders of the Italian Metallurgical Company of Savona have also approved an augmentation in the share capital from £360,000 to £1,200,000, and any further capital that may be needed will be raised by the issue of bonds. The money is required to pay for the purchase of the Raggios Iron Works and a large portion of the shares of the Elba Iron Works Company, the three concerns constituting the second group of the trust. The connection between the two groups will be understood from the fact that the Terni Company hold about one-half of the capital of the Metallurgical Company, and the former have now undertaken to subscribe for an additional number of the latter's shares to the extent of £200,000 within a period of three years.

It is expected that the trust will be of considerable advantage to Italian trade, inasmuch as, apart from coal, the combination control the production of raw materials down to the construction of finished ships. It is claimed that the Italian shipbuilding yards in general have in recent times been able to meet almost the whole of the inland demand for war and merchant vessels, and have already begun to work for abroad, including South America, Spain, Portugal and Greece. The new trust should, it is thought, increase the competitive capabilities of the Italian yards in relation to other countries, and the question therefore becomes of international interest. It will be seen that of the large shipbuilding yards in Italy the trust does not include those of Ansaldo & Co., who have yards at Sestri Ponente and Sampierdarena. It is not quite clear whether the latter have been approached in the matter. However that may be, it is now reported that as a counterblast to the Terni-Savona trust the Ansaldo Company intend to form a combination with the Armstrong Company at Naples. The report may be merely a rumor, but it is advisable to mention it, although it should be accepted with some reserve unless confirmation is forthcoming at an early date.

The Springfield Rotary Planer Type Surfacer.

The Springfield Mfg. Company of Bridgeport, Conn., are building a rotary planer-type surfacer of new design, as shown in the accompanying illustration. This particular machine handles work 4 feet long and 20 inches wide, but the company also build other sizes, for work ranging from 12 to 20 inches wide by 2 feet up to 10 feet in length, using different lug chucks according to the width of the machine. The down feed of the emery wheel is arranged with worm and worm gear, which enables the operator to vary the feed down to one-fourth of 1-1000 inch, a graduated collar enabling him to determine the exact feed. The worm and its gear may be thrown out to enable the operator to quickly adjust the chuck carrying the emery wheel, or rather the emery rim, that being the form used. A counterbalance weight on the tie beam relieves the weight of the chuck on its bearings. The chuck spindle is 2¾ inches in diameter and runs in ball bearings on the cross rail. Water is supplied to the wheel through the spindle, which is made hollow for the purpose. There is a water pan on the table, from which the water is conducted to a receptacle in the bed and is forced back to be used over again by means of a pump. The chuck shown takes a 20-inch



THE SPRINGFIELD ROTARY PLANER TYPE SURFACER.

emery rim, which will surface work from 20 inches down to any narrow width. The chuck with 20-inch rim runs from 960 to 1000 revolutions a minute. The carriage is operated by a rack feed. The surfacer shown weighs 5600 pounds.

The Development of Electric Station Power Plant.*

BY ELIHU THOMSON.

Twenty-five years ago the electric station had its beginning. In 1878 a number of dynamos of the alternating type were belted to steam engines and used for lighting the Place de l'Opera and Rue de l'Opera in Paris. The practice of belt driving, in which the dynamo speed is much higher than the engine speed, was well nigh universal for a period of 10 to 15 years thereafter. The earliest machines which were direct connected to the engine without belting were probably the Edison Jumbo dynamo and the Gordon alternator, each of which was brought out in 1883. The machines up to that time were of very limited capacity. A dynamo that would use 25 to 50 horse-power to drive it was one of large output.

The movement toward direct connections was simultaneous with a great increase of capacity over the then existing machines. The Edison Jumbo was a direct current constant potential dynamo of about 1200 16-candle power incandescent capacity or about 100 kw. in output; small enough, it is true, as compared with our present standards. The Gordon alternator was a revolving field machine, the field being about 8 feet in diameter, revolved by the engine direct (and forming a fly wheel for the same) at a speed of from 140 to 180 revolutions per minute, the periodicity being about 45 cycles. Its capacity was about 5000 incandescent lights, or, roughly, 350 kw. output. These were very large machines in their day. The Edison Jumbo weighed 25 tons, and the Gordon alternator 22 tons. It is interesting to note that the Armington & Sims engine which drove the Edison Jumbo was specially designed to secure relatively high speed, so as to meet, as far as possible, the dynamo conditions. Later on these same high speed engines were extensively employed in electric stations belted to dynamos running from 600 to 1500 revolutions per minute, and employed for incandescent or arc lighting in small units. The example of direct connection gradually spread and the direct connected electric plant has at last almost entirely displaced belt driven machines. The growth was rather slow and less rapid in the United States than in Europe. There was, of course, much work to be done in perfecting details, and the substitution of the large direct connected unit for belt driven types may have been retarded by the exceedingly rapid development in various electrical fields.

The replacement came about partly on account of the increasing output, not only of the stations, but of the units themselves, up to 5000 or 6000 kw. each in some of the large generating stations to-day. As the size of the unit increased the speed, of necessity, came down to accommodate the heavy reciprocating steam engines employed. This, however, so far as the dynamo was concerned, was only to be accomplished by the use of very massive machines. The dynamo machine and other electric machines are essentially high speed machines, and any straining for low speed must always be paid for in excess of material or diminished efficiency, or both. Nevertheless, the direct connected slow speed machine of sufficiently large capacity has proved itself very satisfactory in practice, and has become almost universal. Still engineers have not been content, and it seems as if we are on the eve of another decided change.

The Steam Turbine.

In some cases in cities the vibrations caused by reciprocating engines have, in fact, forced a change in the character of the motive power machines. Instead of bringing down the dynamo to steam engine conditions, we now bring the steam engine to dynamo conditions by changing the type of engine employed. In fact, the new problem was to bring down the turbine engine, with the excessive speed required for economy of steam, to such speed as was within the range of feasible dynamo construction. It is now about 12 to 15 years since the Parsons turbine was applied to drive direct connected dynamos of small capacity. The earliest of these ran at about 10,000 turns per minute, and really presented the difficulty that the speed was far in excess of reasonable dynamo speeds. The thing had, in fact, been overdone. Growth in size of units and perfection of design allowed the speeds to be lowered to about 3000 turns in moderately sized units, and still lower in the largest sized units, thus adapting the speed to a proper proportioning of dynamos. The lower limit of speed depends on the size or capacity of the turbine engine, but it will probably not go much below 500 turns per minute, even in the largest units.

In the De Laval turbine the construction is such that reasonable speeds for dynamo work are only to be obtained by a remarkable development of reducing gear. In such a case the plant becomes no longer direct connected. While in the Parsons form of turbine the steam, entering at one end over the whole wheel and passing in succession sets of vanes carried thereby and stationary vanes or guides alternating therewith, progressively expands until it reaches the exhaust end, in the De Laval the expansion takes place in a nozzle or set of nozzles directed against the vanes of a portion of the periphery of the vanes carrying disk. The form of jet or nozzle is flaring toward the wheel, and the conversion of the kinetic energy of the steam into motion in one direction takes place in the expanding nozzle itself and the fall of temperature and pressure therefore occurs largely before the steam reaches the wheel, which itself revolves in a fairly good vacuum provided by the condenser.

In the lately developed form of turbine due to Mr. Curtis the work of the steam is divided into distinct stages, part of the expansion taking place definitely in each stage, and part only of the periphery of the wheels being acted on by jets or by steam passing the intermediate guides. The action of compounding is somewhat analogous to that in a compound engine in which the turbine wheels of the successive stages are taken to represent the succession from the high pressure to the lowest pressure cylinders. The turbine engine is essentially a machine the efficiency of which depends in large measure upon its exhausting into a vacuum. The condenser is therefore a very important auxiliary. In the Curtis turbine the ability to secure relatively low speeds is shared with the Parsons form, and the ability to govern output by increase or decrease of steam entering the nozzles is shared with the De Laval form. This latter feature is valuable in governing and in meeting overload conditions.

The present intention, however, is not to go into the details of turbine construction. It is rather to point out and emphasize the apparent fact that the low speed direct connected unit—the huge generating plant of to-day—must probably eventually yield to the much smaller, relatively high speed and less costly turbine driven plant. While, perhaps, there will be little if any gain in steam economy at full load, the turbine has the decided advantage that the efficiency curve holds up for partial loads, even for below half load, particularly when the governing is accomplished as above indicated. This valuable feature is, as is well known, entirely absent in the compound engine of ordinary type, the efficiency curve falling off very rapidly with decrease of load to a point which soon neutralizes all the advantage of compounding. The turbine is essentially a high speed rotary engine, an ideal for electric machinery, with simple bearings, constant angular velocity, high light load efficiency and light weight. It is particularly adapted to the large units now in use so extensively. The turbine seems destined to play a large part in the future development of the electric power and lighting station.

While it does not promise great gain in steam economy under full load as compared with the reciprocating types,

* Read before the National Electric Light Association, Chicago, May 28, 1903.

the average result where load changes are taking place will doubtless be that a much better economy is obtained. The gains in original outlay in space taken up and in maintenance costs seem to be so considerable as to be decisive as to its adoption.

Internal Combustion Engines.

Looking still further ahead, can we be assured that it is the ultimate step? Laying aside, as improbable, the direct conversion of the energy of fuel into electric energy, inasmuch as we see no promising signs of its possibility, and considering the fact that the cost of fuel will probably advance steadily as our near the surface coal supplies are worked out, it would seem that we must perforce at last turn to those forms of prime movers which have inherent possibilities of developing much higher efficiencies in the use of fuel than are existent in the steam engine. Even at the present day in certain relatively very small units, the internal combustion engine, such as the gas or oil engine, has shown efficiencies nearly double that of the best steam engine plant, and the partial load efficiency is also satisfactory. There can also be no question that the internal combustion engine is susceptible of improvement such that in large units the present attained efficiency will be far surpassed. It seems even probable that an efficiency of heat conversion up to between 40 and 50 per cent. will some day be practicable—a result about three times better than is attained with steam. The engines which would be used would naturally be of large reciprocating type and comparatively slow speed, unless some form of gas turbine be developed—a matter upon which serious doubts may be expressed.

The Gas Turbine.

What is meant by a gas turbine is a turbine driven by gas expanding from a chamber in which the gas is burned at high pressure and temperature with the requisite amount of air. Such a machine demands the pumping of the air and gas prior to their combustion. The waste gases are, of course, incapable of condensation in a condenser.

The problems involved in a gas turbine are, then, altogether different from those of a steam turbine engine, and they are necessarily more difficult of solution. In favor of the ordinary gas engine is the fact that all grades of fuel gas may be used with almost equal facility, and even the poor gas, of very low calorific value, such as is sometimes a waste product of blast furnaces in iron smelting, may be used. Coal dust, culm and waste of mines of low fuel value may be made to yield gas suitable for feeding gas engines. Liquid fuel, as oil of various grades, is also available, and engines have been run, experimentally at least, by feeding them simply with coal dust itself. The richest fuel, down to the lowest and poorest grade, may, therefore, be employed directly or indirectly in gas engine work, and a good efficiency, much exceeding that obtainable with any form of steam engine, is even now obtainable, although the units are not very large. Much remains to be done, however, to render the larger types of gas engines equally available with steam engines, and the day of their rapid introduction is probably still far enough away to cause little need for hesitancy in the adoption of turbine plants for electric stations.

Where soft coal is first converted into gas by a gas producer, useful by-products may be obtained which have sufficient value to warrant their being collected and sold. Moreover, the gas may be continuously produced and stored until needed. These conditions are, of course, well known. An advantage obtained from the gas engine, and one which has frequently been pointed out, is the short time required to get it into work and the equally quick shutting down of running expense when it is stopped. Provided only the store of fuel is ready to be drawn upon, there is no expense for fuel except during running, neglecting, of course, interest on plant. A quickly stopped and started gas engine plant can take care of load peaks most effectively and most efficiently. But if the gas engine should ever become a general source of power, what becomes of our driving? Will it be brought again to belting or some form of gearing up for increase of speed, or will the heavy direct driven dynamo again be found coupled to gas engines instead of reciprocating steam engines?

It is not probable that large gas engines will be run much faster than steam engines of equal power, so that the queries just propounded will need to be answered by future engineering, provided we are right in assuming that the future economical conversion of the energy of fuel into power must come through improvement and increase of size of gas engines.

In the considerations above advanced the use of water power is purposely neglected. The amount of water power which can be rendered available with economy is limited, and it is fairly local in spite of long distance transmission, while the need of electric generating stations will be more extended and universal as time goes on. The heavily trafficked trunk line railroads will need them, and the replacement of small powers by electric motors is a future business which has only just begun, according to all present indications.

Eye Bar Bridge Cables Opposed.

Bridge Commissioner Lindenthal's revised plans for the Manhattan Bridge, New York, calling for the use of eye bars instead of wire cables in the superstructure, were vigorously attacked on June 19 at the public hearing of the Finance Committee of the Board of Aldermen. The hearing was on the application of the Commissioner, approved by the Board of Estimate and Apportionment, for authority to issue corporate stock to the amount of $6,533,000 for the construction of this bridge. Alderman Doull asked if the American Bridge Company have not a monopoly by control of patents for the eye bar chains to be used for suspension work on the bridge. Mr. Lindenthal declared there are no patents on these eye bar chains, and that they were substituted for wire cables because they are just as good, save time and are cheaper.

O. F. Nichols, engineer in charge of the Williamsburg Bridge, objected to eye bars, saying they would not be as strong or as durable as wire cables. He declared also that an eye bar cable would cost more than the wire cable and take longer to construct.

Richard S. Buck and Foster Crowell also spoke against the use of an eye bar cable. The committee decided in favor of eye bars.

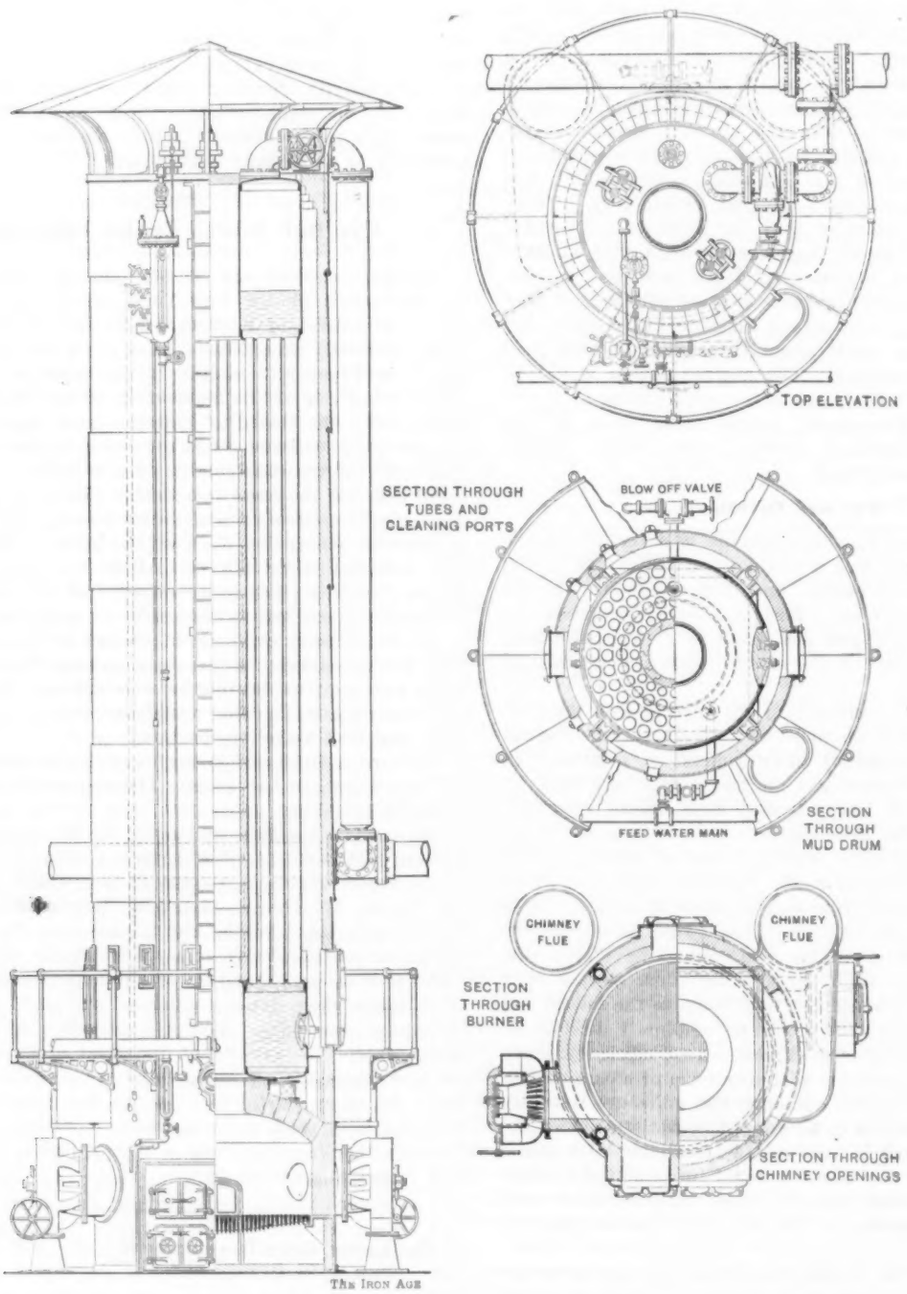
Mayor Low on June 23 backed up Mr. Lindenthal by sending to the Board of Aldermen a copy of the report of the expert engineers, George S. Morison, C. C. Schneider, Henry W. Hodge, Mansfield Merriman and Theodore Cooper, appointed by him to pass upon the engineering features of the bridge. In his letter, the Mayor says: "The professional standing of these gentlemen is such as to make their determination of the questions raised absolutely conclusive. You will perceive that upon all points except the quality of the steel proposed for the eye bar cables the report sustains the plans, without reserve, in every particular. As to the quality of steel proposed to be used, the commission of experts wished to make further investigations, and promised a supplementary report at an early day."

The Leiter Coke Development.—The first important coke industry in Illinois is being developed by Joseph Leiter at a town which is now building in Southern Illinois, called Zeigler. The property acquired consists of a tract of land of 8000 acres, which was purchased by Mr. Leiter some time ago, and is underlaid with a large deposit of bituminous coal. Two shafts are being sunk, and construction has commenced on two additional shafts. The coal will be manufactured into coke on the property. The plans for the plant were prepared by Robert W. Hunt & Co., engineers, Chicago. The property is covered with timber, which is being rapidly cut down and manufactured into lumber for the construction of dwellings at Zeigler. Coke made by the Leiter process was tested a year or more ago by the blast furnace department of the Illinois Steel Company, at Chicago, with fairly satisfactory results. The project involves the expenditure of $1,000,000.

The Moore Vertical Water Tube Boiler.

The usual practice of applying burning gases to the chilling surfaces of steam boilers before those gases have had an opportunity to complete the process of combustion is acknowledged to be the cause of a very considerable loss in two important particulars: 1, The burning flame is extinguished, with a resulting deposit of soot and smoke, and, 2, a certain amount of combustible gas passes off into the chimney, unconsumed. In order, then, to utilize the maximum amount of heat from a given amount of fuel it is of the first importance that the furnace should be designed to complete the combustion of the burning gases before they are permitted to come into contact with any chilling surfaces. This not only calls for high temperature, but it also calls for a certain element of time. It is the province of the furnace to burn the fuel, and of the boiler to absorb the resulting heat, but neither process should overlap or interfere with the other. It is also important that all of the heat from the furnace should find its way into the water in the boiler, or, in other words, the temperature of the chimney gases should be reduced to the lowest possible point before being wasted into the air. The usual practice in this respect is to maintain a chimney gas temperature of from 50 to 75 degrees in excess of the temperature of the steam that is being used. It is evident that where the chimney gases pass by the steam level of a boiler this chimney temperature is essential, as anything of a lower temperature would tend to condense the steam in the boiler.

Suppose, however, that a vertical water tube boiler is under consideration, and that this boiler is something like 30 feet in hight. That it is taking feed water near the bottom at a temperature of about 150 degrees, and that it is delivering superheated steam at 175 pounds to a steam turbine, as is not unusual in traction work. The difference in temperature between the steam drum of such a boiler and the feed water level would be something near 300 degrees, and it is evident that the chimney gas temperature would have to carry with it a temperature of some 300 degrees, more or less, of heat, according as it left the boiler from the steam drum level or from the feed water level. In other words, assuming a condition of complete combustion on the part of the furnace, there is an opportunity for the boiler to absorb considerable more heat from the chimney gases if the usual practice of passing these gases off by the



THE MOORE 250 HORSE-POWER VERTICAL BOILER FOR BLAST FURNACE WORK.

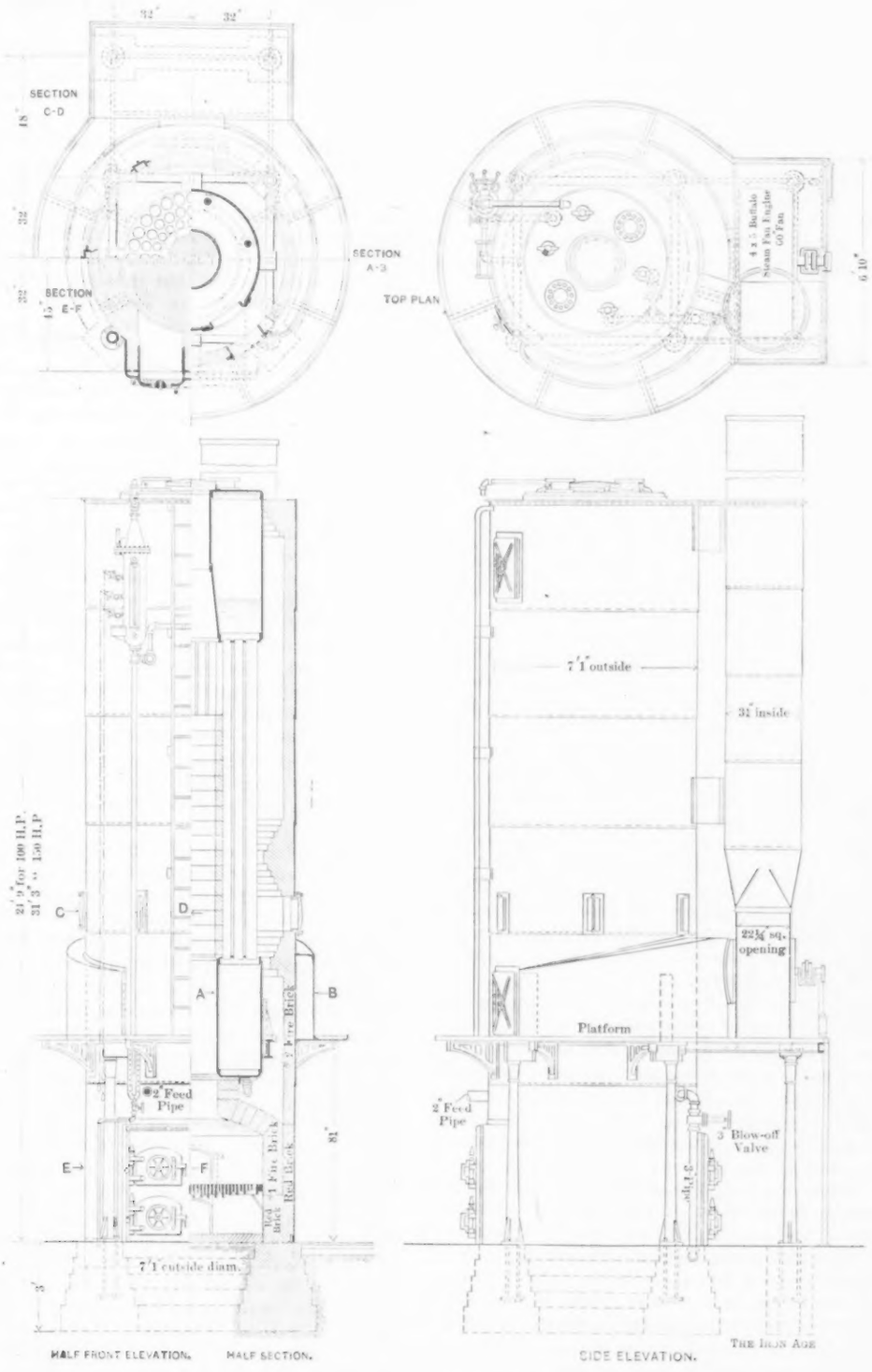
steam drum can be reversed and these gases can be applied to the steam drum level and afterward drawn off at the feed water level.

It was these considerations which led to the design of the boiler and boiler furnace recently patented by Enos L. Moore of Chicago, and illustrated herewith. Another consideration which figured in the design was the avoidance of rectangular masonry in combination with a circular form of boiler. Rectangular walls, aside from their unmechanical adaptability to circular forms, are subject to air cracks, and these are well recognized sources of loss.

The general scheme of the Moore boiler is very similar to that of a two-pass hot blast stove with a central combustion chamber; and the action of the gas is identical in this: that the descent of the cooler gas, which has given up its heat to the boiler, is assisted by gravity, while the hotter gas is opposed in its descent until such time as it finds a cooling surface to rob it of its heat. The distribution of the heat therefore is ideal, and there is no occasion for baffle plates or interfering walls of any kind.

As the heated products of combustion leave the central combustion chamber they come in contact with the boiler at its zone of highest temperature, and as they give up their heat they descend to levels of lower and lower temperature until they reach the feed water level, when they are drawn off through equally disposed chimney exits. The enlarged section about the boiler tubes tends also to arrest the velocity of the escaping gases, thus giving more time for the boiler to perform its function of absorption.

Two arrangements are shown, one with patented gas burners for blast furnace service, when underground



THE MOORE 100 HORSE-POWER VERTICAL WATER TUBE BOILER.

flues and large chimneys are the rule; and another with induced draft for general manufacturing and traction enterprises. It is a matter of some surprise to those who hvae looked into the subject of mechanical draft that this apparatus of proved efficiency is not more generally employed.

It is estimated that as compared with chimney draft there is a saving in heat of anywhere from 40 to 400 per cent. by the use of induced draft, and to govern the pressure in the boiler, or regulate it, as one would the speed of an engine, it is only necessary to introduce into the steam connections to the fan engine a valve, which regulates the boiler pressure to with 1 pound of the pressure required. If the boiler is called upon for more than the usual amount of steam the speed of the exhaust fan is automatically increased, and *vice versa*. This, in itself, is a feature of the greatest importance; and when the load of an engine is constant it follows that the constant regulation of the boiler is an essential to economy.

Regarding the mechanical details of the Moore boiler, it will be observed that the boiler furnace is immediately under the boiler, so that not only the direct, but the radiated heat from the furnace, will find its way to the boiler. Fire doors before and behind are a distinct advance over the usual long grates accessible only from the front, giving the attendant every advantage in the control of his fire. The mud drum is protected from the fire by the spherical dome of the furnace, and the incasing sheet iron jacket binds the masonry from top to bottom, guaranteeing against air cracks and enabling a very considerable reduction in the thickness of the furnace walls above the mud drum level. The tubes are arranged upon what might be called semi-radial, concentric lines, with a view to accessibility for cleaning. Small cleaning doors are also provided for this purpose. A canopy is shown over the blast furnace arrangement, and where more than a single unit is employed, as is usually the case, this canopy will take the form of a continuous roof, thus protecting the boilers at somewhat less cost than would be incident to the erection of a boiler house. These boilers are suitable for units ranging from 100 to 300 horse-power, and by lengthening the tubes in the 100 unit shown the same diameters will enable the builders to increase the capacity of that unit to 175 horse-power. Mechanical stokers are applicable and to be recommended where conditions favor the first cost. Attention is also called to the feed water indicator, which enables the attendant to see where his water level is from the firing level.

Each boiler consists of two annular drums, with a series of straight vertical tubes connecting the lower or mud drum to the upper or steam drum. These tubes are of graduated diameters, arranged on concentric lines, and so spaced that the spaces between the tubes and the top head of the mud drum are accessible for cleaning. The mud drum has heavy cast lugs riveted to it, which rest upon an I-beam frame carried by iron columns, so that the weight of the boiler and its contents is independent of the masonry. The furnace is circular in form, with a heavy fire brick spherical dome, or roof, and being located immediately beneath the boiler, this furnace roof protects the mud drum from the direct heat of the fire. The products of combustion pass through a circular opening in the center of the furnace roof, and from there they rise to a point very near to the steam drum level, through a fire brick tunnel, located inside of the inner circle of tubes. From the top of the central fire brick tunnel the gases expand throughout the higher level of the boiler tubes, and are carried down around the same to the mud drum level, where a series of four equally spaced openings are provided to the breeching.

In the case of the blast furnace boiler, the chimney gases are conducted from the breeching through two vertical downtakes to the underground chimney flue; and in a boiler for general use an induced draft is provided to carry the chimney gases from the breeching to the roof level. The whole of the masonry is inclosed in a sheet iron jacket, and to this is fixed a cleaning platform, a ladder to the steam drum level, and, where circumstances justify it, a roof or canopy. In all cases, there are front and rear fire doors, and in a blast furnace boiler there is a special burner, which is provided in pairs and located to give a spiral motion to the gas in the furnace.

Plant for Building the Curtis Turbine.

Through the courtesy of the General Electric Company representatives of the technical press of New York visited the works at Schenectady for the purpose of examining the equipment provided for manufacturing the Curtis steam turbine. The party left the Grand Central Depot last Thursday morning on a special car attached to the Fast Mail and arrived at the works at noon. A bountiful luncheon had been prepared in the company's kitchen, where all the cooking is done by electricity.

Our readers are familiar with the general design of the Curtis turbine, so that it is not necessary to repeat the description now. In economy it is equal, and if anything a little superior, to the best types of Corliss engines. It possesses the advantages of less space occupied and smaller first cost, and operates at the greater speeds called for in the generator service. As yet it is too early to state even the probable life of one of these machines. In the engine room of the works is a 500-kw. turbine, which has been in operation every day since April of last year. A few days since an examination was made and the only sign of wear was of the stationary blade, but this was so extremely slight as to have no effect upon the efficiency. Another advantage is found in the reduced consumption of water. Practically all the water is returned to the boiler and used over, fresh water being only furnished to replace leakage, which is exceedingly small. Impure water can be used and oil separators are unnecessary, as no oil is introduced into the engine. The effect of this upon the boilers will be appreciated.

At the Schenectady works one building, 90 x 800 feet, is devoted exclusively to the manufacture of turbines. This by no means represents the total equipment employed upon this work, as many operations are performed in other departments. To show that all this space is needed, we have only to state the fact that the company now have orders for turbines aggregating 185,000 kw., or about 225,000 horse-power. This would tax the present capacity to the utmost to finish before 1905, therefore a contract has been closed for a building to be completed by April next, which will more than double the output.

As might be expected in work of this character, new tools and appliances of special desgn were required in order to insure economical production. One of the most interesting of these was designed by John Riddell, mechanical superintendent of the company. The moving buckets of the Curtis turbine are at the periphery of the revolving disk, the axis of each bucket lying in a radial line. The inside or working face of the bucket, against which the steam impinges, is the segment of a curve having three radii. Steam from the nozzles enters at the side and passes through the first set of moving buckets, which are rotated by the steam striking the concave face of the buckets. The steam then flows through stationary blades to the second set of buckets, and so on. Approximately the steam follows a series of reverse curves. In the smaller sizes of turbines the buckets are formed intergral with the disk and are cut from the solid; in the larger sizes the buckets are made of gun metal, cast in segments, which are secured to the disk. In the latest machine for doing this work the blank disk is held in a vertical plane passing through the center of the machine. The cutting tool has a swinging motion across the face of the disk. A cam actuating a pawl engaging a toothed wheel advances the tool, the depth of cut being regulated by the adjustment of this cam. The cutter, having only a single cutting edge, travels across the face of the disk, following accurately the three curves above mentioned, and then returns for a new cut. In another form of machine the cutter makes a complete revolution, being withdrawn during the idle part of the stroke in order to clear the wheel.

The British Tariff Agitation.

LONDON, June 13, 1903.—I am inclined to think that we are at the beginning and not at the end of the tariff agitation, and that much water will flow under the bridges before a preferential tariff becomes an accomplished fact, or is for ever relegated to the limbo of splendid failures.

The Real Object of the Movement.

It may safely be affirmed that, with the exception of a small protectionist rump, there is absolutely no movement in this country seeking to renounce free trade principles as a main object. The point always to be borne in mind is that the proposed departure from free trade principles is quite subsidiary to the main object—namely, the political welding together of the various parts of the British Empire. The contention of imperial federationists is that it is well worth some economic loss to secure a great political object.

It is contended: 1. That the burden of defending the empire is becoming too heavy for the taxpayers of Great Britain alone. It is argued that the colonial taxpayer should be associated with the British taxpayer in the charges made for the common defense of the empire. 2. It is thought that more effective precautions must be taken to secure an adequate supply of food in time of war. In 1901 our total imports of wheat and flour were equivalent to 101,000,000 hundredweight of wheat, while we grew 28,500,000 hundredweight in Great Britain. Of the quantity imported, we bought from the United States 66,800,000 hundredweight, only 19,500,000 hundredweight coming from British possessions. 3. The actual military protection of the British Empire is also urged as a reason for imperial federation on a Zollverein basis. The decline of the agricultural industry in Great Britain has an adverse influence upon the fighting material for the army. It is urged that a protective tariff which bears lightly upon our colonies would thus have great political advantages, in addition to developing agricultural pursuits in this country, and so improving both the physique and *morale* of the working classes

The advocates of preferential tariffs, proceeding largely upon the facts sketched above (I omit for the moment the purely industrial aspect), are confirmed in their conviction that so far from Great Britain spending less upon military armaments it must spend more. They argue that increasing competition between the nations of the world finds expression in two directions—commerce and war. They argue that the struggle between the nations takes for long periods the nature of commercial, political or industrial competition, but that ultimately the state of tension passes the limits that war breaks out and that the strongest wins.

The Salient Facts of the Problem.

The foregoing indicates the considerations which have led to the movement for preferential tariffs, apart from the industrial and commercial issues involved. The colonies are gradually emerging into complete economic independence, and so far from them coming more closely to the mother country in commerce and sentiment, they are, commercially at least, receding from Great Britain. The attitude of the colonies toward the mother country would seem to be that they are not prepared to make any direct subvention without an imperial council, at which the colonies would be represented, but that they have no objection to some such system of taxation as is involved in preferential tariffs. There is, however, one very important exception—namely, Australia. It is doubtful at the present moment whether the Australian commonwealth would, in any circumstances, consent to any fiscal preference. Inasmuch as our trade with Australia exceeds £50,000,000 a year, imports and exports together, it is obvious that unless Australia stands in with Mr. Chamberlain the scheme must fall to the ground, whatever the other colonies may say or do.

An important factor in the problem, however, is that of population. We hear so much of the British colonies nowadays that one hardly realizes what a small population they represent. Thus the population of Canada is 5,170,000; Australia, 3,577,000; British South Africa, 1,000,000; New Zealand, 767,000; Cape Colony, 587,000; British South Africa (British only), 4000; Cape Colony (British only), 267,000; Transvaal, 258,000; Orange River Colony, 78,000; Natal, 69,000; Rhodesia, 15,000; that is to say, there are 41,500,000 people in Great Britain, and her colonial population all told (excluding blacks) is only 11,000,000.

A second point is that two-thirds of British imported raw materials which are vital to British manufacturers are derived from foreign nations.

A third fact is that more than 75 per cent. of the imported foodstuffs comes from foreign countries.

A fourth fact is that our present commercial relations with foreign nations carry the "most favored nation" treatment with them, which is in its way a sort of system of preferential tariffs. If we establish preferential trading with our colonies, thereby creating maximum and minimum tariffs, the former for foreign nations and the latter for British possessions, we deprive ourselves of "most favored nation" treatment for two-thirds of our export trade.

The Lions in the Path.

If the difficulties sketched out above could be overcome; if the political obstacle of taxing foodstuffs could be obviated; there still remain stupendous difficulties and objections to any methods which may be adopted to secure preferential treatment. Great Britain's purchases from her colonies are either of raw material or food. Our colonies as a general proposition do not sell to us manufactured goods. Thus it follows that if we adopt a protective tariff it means taxation on food and upon raw materials. But to put taxation on food would work inequitably among the colonies, for while Canada would gain 42 per cent. of the advantage from a tariff on wheat Cape Colony would benefit nothing. Taxes on grain and meat would increase the cost of living, while wages, as experience shows, follow such rise slowly and imperfectly. To tax raw materials, such as wool, means to increase the cost of British finished products, and so handicap us in the world's market.

The Colonial Secretary, foreseeing the force of these arguments upon those whom he desires to win to his side, gilds the pill by a proposal to apply the money resulting from taxes on food toward old age pensions. But this proposal leads to a dilemma: either the money would be obtained by the continued importation of foreign produce, in which case the British colonies gain nothing, or colonial produce would expel foreign food, in which case the money for old age pensions would not be forthcoming.

From conversations I have had with business men, and from the usual channels of information, it is evident that, as a commercial proposition no responsible business man in Great Britain would accept preferential tariffs for a single moment. Looming behind the commercial side of the question, however, is the political side. It is undeniable that, during the last few years, there has been an outbreak of exuberant imperialism. It is therefore just possible, although I do not think probable, that the enthusiasm for a federated empire may outweigh the commercial defects of the scheme. S. G. H.

New Canal and Ore Docks at Buffalo.—Contracts were last week awarded to the Buffalo Dredging Company for the construction of a canal, slip and system of docks to be built at Buffalo, N. Y., by the Buffalo & Susquehanna Iron Company, the Buffalo & Susquehanna Railroad Company and the Pennsylvania Railroad Company jointly. The canal will be 3900 feet long, 200 feet wide and 23 feet deep, and will extend east from the harbor line into the Buffalo & Susquehanna and Pennsylvania properties, which adjoin. The slip will be 800 feet long, 150 feet wide and the same depth as the canal, and will extend into the property of the Lackawanna Steel Company, who will join in its construction. Coal and ore docks will be built along both sides of the canal. The object is to give all of the companies interested ample dockage and permit of the unloading of ore direct to the blast furnaces. It is expected the work will be completed in 15 months, and will cost about $1,000,000.

Safety Appliances on Railroads.

Important Test Case in the United States Supreme Court.

WASHINGTON, D. C., June 23, 1903.—The United States Supreme Court, prior to the adjournment for the summer recess, which has just been taken, granted the application of the Attorney-General for a writ of certiorari and a motion to intervene on the part of the United States in the case of W. O. Johnson *vs.* the Southern Pacific Railway Company, the effect of which will be to bring before the court of last resort an interesting controversy in which is involved the practical validity of the law requiring the use of automatic couplers on rolling stock and the question as to whether Congress intended to create a monopoly by causing all cars engaged in commerce between the States to be equipped with the same pattern of coupler. An important question as to whether cars not actually moving in a train running from State to State are "engaged in interstate commerce" within the meaning of the safety appliance act is also an issue. The fact that the Interstate Commerce Commission has taken a lively interest in this case, having induced the Attorney-General to intervene therein, lends a special significance to the controversy, for the reason that the enforcement of the safety appliance act against all railroads of the country is in the hands of the Commission.

The Facts in the Case.

The case in point arose through an injury suffered by the plaintiff, Johnson, who was head brakeman on a freight train on the Southern Pacific Railroad. A dining car which had been hauled from San Francisco, Cal., to Promontory, Utah, was there cut off and placed on a siding, to be picked up by the next West bound train and hauled back to San Francisco. The conductor of a freight train which arrived at Promontory was directed to put the dining car on a turntable, turn it and place it back on the siding. The plaintiff Johnson was directed to couple the freight engine to the dining car and undertook to do so, but the engine being equipped with a Janney coupler and the dining car with a Miller hook, he found it necessary to use a link and pin. This required him to go between the engine and the car, and in making the coupling, after two failures, his hand was caught and crushed so that it became necessary to amputate his arm above the wrist. For this injury he began a suit for damages against the railroad company under the Safety Appliance act.

In deciding this case, the Circuit Court of Appeals of the Eighth Circuit ruled against the plaintiff on grounds which, the Interstate Commerce Commission holds, render the Safety Appliance act null and void. The court held in the first place that inasmuch as the Safety Appliance act changes the common law with regard to the relations of master and servant, and is, in fact, a penal statute, it must be strictly construed in favor of the railroads. Before its enactment brakemen coupling cars used in interstate commerce without automatic couplers assumed the risk and danger of that employment, and carriers were not liable for injuries received. Inasmuch, therefore, as the statute requires common carriers to "equip their cars with automatic couplers . . . and their locomotives with driving wheel brakes," it cannot be held that the railroads are obliged to equip locomotives also with automatic couplers. But, even assuming that the law required the use of automatic couplers on all engines, the court held that the statute was complied with in this case, although the Janney coupler on the engine would not engage automatically with the Miller hook on the car. With regard to the question as to whether Congress intended to require all railroads to be equipped with couplers of the same type, the court said:

> For the reasons which have been stated, this statute may not be lawfully extended by judicial construction beyond the fair meaning of its language. There is nothing in it which requires a common carrier engaged in interstate commerce to have every car on its railroad equipped with the same kind of coupling, or which requires it to have every car equipped with a coupler which will couple automatically with every other coupler with which it may be brought into contact in the usual course of business upon a great transcontinental system of railroads. If the lawmakers had intended to require such an equipment it would have been easy for them to have said so, and the fact that they made no such requirement raises the legal presumption that they intended to make none.

The Interstate Commerce Question.

Concerning the interstate commerce question involved—namely, as to whether the Safety Appliance act covers the turning or shifting of empty cars—the court said:

> The fact that such cars have been or will be so used does not constitute their use in moving interstate traffic, because the prohibition is not of the hauling of cars that have been or will be used in such traffic, but only of those used in moving that traffic. Cars loaded with articles of interstate commerce, and started toward their ultimate destination, whether in trains, in yards or on side tracks, may well be held to come within the terms of this statute and the intent of Congress. But vacant cars which are not and may never be so used cannot be held to come within the fair import of the terms of this law, either because their owner intends to use them for that purpose at some future time or because they have been or will be so used. Empty cars in repair shops, in yards, on side tracks, those in use to transport traffic within a State and for that purpose alone, are not in use to move articles of interstate commerce, and do not fall under the ban of this law. Neither the empty dining car standing upon the side track nor the freight engine which was used to turn it at the little station in Utah was then used in moving interstate traffic, within the meaning of this statute, and this case does not fall within the provisions of this law.

Judge Thayer dissented from the opinion of the majority of the court, on the ground that the word "car" is used in the statute as a generic term, and applies to engines and tenders, as well as to ordinary cars. He concurred in the judgment of the court, however, for the reason that the freight engine in this case was equipped with a coupler which Congress did not require to be of the same pattern as that in use on all rolling stock.

The Supreme Court will be asked by the Attorney-General to hold, first, that the dining car in question was engaged in interstate commerce; and, second, that the engine should have been equipped with a device that would have enabled it to be automatically coupled to the dining car. A decision favorable to the plaintiff and to the United States will result in sweeping changes in the various types of safety appliances now in use and in the general adoption of uniform couplers. In any event, material changes in the equipment will be brought about during the coming year, as the result of the amendment of the Safety Appliance law by the act of March 2, 1903, which requires that couplers shall engage automatically by impact, whether or not they are of the "same kind, make or type." Not the least interesting question involved in this case is the extent to which the Attorney-General will be permitted to intervene on behalf of the planitiff against railroads in the enforcement of the law.

W. L. C.

The Railways of the World.

The railroad is one of the greatest forces of modern civilization. It opens new territory to colonization, facilitates the growth of industries, and is one of the cardinal points of internal commerce. Indeed, statistics would seem to indicate that the marvelous growth of the United States and Canada has been largely due to the building of railroads. It may be a matter of regret that so much time is necessarily consumed in the gathering of statistics relating to railroad interests, but this is a drawback common to all statistical records. The very latest official data available, concerning the railroads of the United States, is the report of the Interstate Commerce Commission for the year ending June 30, 1902, and statistics covering the railroads of the entire world are only available up to the close of the calendar year 1901. The fact, however, that 1901 was the first year of the twentieth century makes it an excellent one, from an historical standpoint, for comparison of data for the previous decades.

According to the summary of railroad statistics made by the Interstate Commerce Commission on July 1 of last year, the single track mileage in the United States had considerably passed the 200,000-mile limit, the actual figures being 202,471 miles. From commercial data, however, we believe that during the last half of 1902 a con-

servative estimate of the railroads built was 2800 miles, the total for the year being about 5700 miles, and about the latter part of March it was estimated that 8500 miles of railroad were under contract, 6000 miles of which was for new track. It seems, then, that the total single track mileage now operative in the United States is in the neighborhood of 208,000 miles. The official figures of the entire trackage, including sidings and double track, on July 1 a year ago was a little less than 275,000 miles. The track built during the last year, however, would probably bring the total close to 285,000 miles. During the fiscal year ending the last of June, 1900, the increase in mileage of the United States was 5234 miles. The average increase for the last three years, therefore, has been considerably over 5000 miles annually, but the great feats in railroad building in this country were made during the years 1879 and 1887.

According to the world's statistics prepared by the *Archiv für Eisenbahnwesen* the aggregate length of railroads in the first year of the twentieth century exceeded, for the first time in history, the 500,000-mile mark, the grand total being placed at 507,515 miles. According to the data obtained from this source there has been a steady and a material increase in railroad building since 1896, the increase in the year 1901 being placed at 17,000 miles.

From a world standpoint the most prominent feature in railroad building in recent years has been the amount of such construction in Asia and Africa. Mileage thus far opened on these two continents, however, is trifling compared to the area and population, but it has only marked the beginning of a new era of material prosperity, a revival or a rejuvenation of the latent forces of these old continents; and, especially in Asia, the prospect is for an accelerated railroad building. Asia and European Russia are the two great fields promising early returns from improved transportation facilities. In fact the railroad mileage in Asia has increased 50 per cent. in six years, at the close of 1901 there being nearly 42,000 miles of railroad operated against 28,000 miles in 1895, and the building in 1901 was a little more than in Europe.

An interesting, if not an important, feature is the fact that North America has more railroad than Europe and Asia together, and the two Americas more than all the rest of the world combined. For the four years prior to 1889 Europe is credited with building more railroads than the Americas, which had not been the case before for many, many years. Since 1889, however, the Americas, especially North America, have been gaining steadily as compared with Europe.

In the so-called new continents—North and South America and Australia—it is estimated that at the beginning of 1902 there were 290,806 miles of track, while in the old world, embracing Europe, Asia and Africa, the total mileage was 236,709 miles. North America alone was credited with 226,503 miles, but as we have seen from recent statistics the total trackage in the United States alone exceeds this limit considerably. Europe is said to be operating 180,708 miles. Africa and Australia are nearly equally provided, the trackage being placed at 14,187 for Africa and 15,649 miles for Australia. Asia is operating 41,413 miles and South America 26,654 miles.

While Russia has been conspicuously before the world and is associated in our minds with railroad development probably more than any other old world country, the great increase in Asia, it should be remarked, has been due to the activity in British India more than to the building of railroads in Russia, as at the end of 1901 British India was being served by 25,373 miles, while Russia in Asia, including the Chinese Eastern, was operating but 7323 miles. India, however, has a population 40 times that of Asiatic Russia; hence the necessity for greater railway facilities. But it is noted that even during the last four years there has been greater railway building in India than in Asiatic Russia. However, from 1897 to 1901 inclusive Russia constructed 70 per cent. more railroads in Europe than in Asia and has great need for continuing activity in the former field.

The German Empire and Russia lead all other European countries in the amount of railways constructed, Germany having a little more and Russia a little less than 32,000 miles operative, but Russia has probably already taken the lead, having 3658 inhabitants for every mile of railroad, while Germany has 1712 inhabitants per railroad mile.

Great Britain in Europe, because of its insular situation and restricted territory, naturally makes a modest showing, being credited with but 22,100 miles of road; but it possesses two-thirds of the railroads in Africa and nearly all the mileage in India, and with Canada and Australia possesses nearly 92,000 miles, being twice as large as any nation other than the United States. In fact, in the United States there are about 390 people for every mile of railroad, while in Europe there are 2205 inhabitants for every mile; in Great Britain and Ireland, 1884; in France, 1425; in the German Empire, 1712; in Austria-Hungary, 2012; in Belgium, 1666, and in Italy, 3285 people to every mile of railroad. It is important to note, too, that this does not take into consideration the street railways, the electric and other lines which have multiplied so rapidly in this country and other lands in recent years. From this revelation we find how the American has won his title of "ubiquitous," having been educated to the rail from early childhood. However, our German authority claims that Canada possesses 294 and Australia 316 inhabitants to every mile of railroad.

According to this same German authority the capital invested in railroads in Europe amounts to $20,246,000,000. The capital statistics for other parts of the world, however, are less complete, but for about four-fifths of the mileage the total capital is estimated to be $15,490,000,000, the average per mile being about 45 per cent. to the average in Europe. These latter statistics, however, seem entitled to less credence than do the mileage compilations. According to the Interstate Commerce Commission the aggregate capital invested in railroads in the United States amounts to $12,134,182,964, of which $6,109,981,669 consists of funded debt. Of this capital stock about 44.6 per cent. of the whole pays no dividends. It is shown, however, that this unproductive capital is largely in common shares, which during former times of construction and reorganization were issued as a bonus to buyers of bonds and intended to cover latent earning capacity.

No statistics are available upon which to determine the productiveness of European railroads, but in this country it is evident that nearly half of the railroads are not earning sufficient to pay dividends on inflated stock. It is well known, however, that the majority of the well organized and best managed roads are paying handsome profits.

The railroads of the United States give employment to more than 1,000,000 persons, who, with their families, constitute about 8 per cent. of the entire population of the country. The amount paid in salaries and wages for the fiscal year ended June 30, 1902, aggregated $676,028,592, being 60½ per cent. of the entire operating expenses. Seen in this light the labor cost of railroads is a most important factor, and one gets a glimpse of what recent advances to employees mean to the railroads and the effect upon the dividend paying capabilities of the various companies.

The total capital invested in railroads throughout the world may be placed at from something between $37,000,000,000 and $40,000,000,000, nearly all of which has been invested within a period of 75 years.

These figures are certainly interesting and give a comprehensive idea of the magnitude and importance of the railway transportation interests.

One of the greatest disappointments of the day in the line of utilizing a product of the laboratory is liquid air. So soon as it was known to be possible to produce a very low temperature by compressing air to great density and liquifying it, it was supposed to be available for a great many industrial purposes, but it now appears that the expense of producing liquid air is far greater than the methods of obtaining low temperatures now in use, and all the schemes based upon it have had to be abandoned. "If we worked our ice factories and cooling plants by the use of liquid air," says Dr. von Linde in *Cassier's Magazine*, "the cost would be from 20 to 50 times greater than the methods now in general use."

Government Liens on War Ships.

Attorney-General Holds They Are Paramount.

WASHINGTON, D. C., June 23, 1903.—The granting of an injunction by the Virginia courts to prevent the Navy Department from seizing the cruiser "Galveston," now ready for launching at the yard of the William R. Trigg Shipbuilding Company, Richmond, Va., and the levying of an attachment by the Babcock & Wilcox Company against the cruiser "Chattanooga," now building at the Crescent Shipbuilding Company's yard at Elizabethport, N. J., have brought to a sharp issue the question as to the Government's title in war vessels under construction and the priority of its lien over the claims of creditors who have furnished materials for the vessels. While the two cases referred to have served as texts for the deliberations of the Secretary of the Navy and the Attorney-General, it is well understood that the chief interest of the departments relates to the 12 vessels, aggregating between $15,000,000 and $20,000,000 in value, which are now in course of construction at the various plants of the United States Shipbuilding Company, and which it is feared may be delayed by reason of complications attending the projected financial reorganization.

The original plan of the Navy Department to take the "Galveston" by force, launch her and complete her at the Norfolk Navy Yard, was modified a day or two ago at the suggestion of the Attorney-General, who proposed to file a stipulation and bond with the court which granted the injunction against the United States, but the necessity of taking this action was obviated yesterday when the court dissolved the injunction, thereby releasing the vessel, which will probably be launched in the course of a few days. The incident, however, has served to draw the attention of the officials of the Department of Justice to what is regarded as a very important question, and the Attorney-General has prepared an elaborate opinion for the guidance of the Navy Department in the event of any further difficulties.

In the contracts between the Government and the constituent companies of the United States Shipbuilding Company it is provided that in case of delay the Government may take the work out of the hands of the contractors and complete the vessels as it may see fit. While the officials of the company express the belief that there will be no delay on the Government work, the Navy Department has nevertheless regarded it as advisable to intimate that delay will not be tolerated, and the outcome is therefore awaited with considerable interest. Until the Government inspectors in charge of the work of the various vessels report to the Department that progress thereon has been interrupted no action will be taken.

Opinion of the Attorney-General.

In ruling upon the questions presented by the Secretary of the Navy concerning the "Galveston" and "Chattanooga" and the revenue cutter "Mohawk," which is also being built by the Trigg Company, the Attorney-General states that the issue raised is the "question of the right and power of the United States to take immediate and complete possession for all purposes of vessels of the United States in course of completion under contracts with shipbuilders when there has been a breach of the contract with the latter." At this time three vessels are affected, he says, but the question might at any time involve any or all Government vessels under construction by private parties, and therefore the subject is "one of vital importance in respect to national and sovereign interests." Referring to the case of the cruiser "Galveston," the Attorney-General sets out the terms of the contract with the Trigg Company, the failure to proceed with the work, the action of certain claimants and material men in objecting to the launching of the ship by the Government and challenging the exclusiveness of the Government's title and the priority of its lien. Continuing, the Attorney-General says:

> The question of law is whether the United States is legally entitled to proceed as proposed. It is unnecessary to consider the authorities defining certain qualifications upon the doctrine of Government exemption from suit, or validating liens under some circumstances against property owned or claimed by the Government. Such authorities do not seem to me to be applicable to the present situation. Nor is it necessary to advert to the express recognition by this contract of the paramount title and lien of the Government by the company in the contingency which has happened; provisions creating conditions and covenants which, it would seem, devolve upon and bind the receiver on principle and authority, especially in view of his endeavors to adopt the contract and continue work thereunder. It may be remarked that in this way the receiver appears to have ratified the contract, if, indeed, his ratification were essential to the Government right to effectuate complete possession under the plain and specific terms of the instrument.

After referring to the various statutes relating to the subject of attachments against property in which the United States has an interest, or against which it has set up a claim, he asserts that "the right of a party in ordinary litigation to a release of property from attachment upon giving a bond for indemnity is fundamental," and he adds that this doctrine was distinctly recognized in the act of 1864.

"This doctrine manifestly applies," continues the Attorney-General, "with greater force and reason in a case affecting the Government as *parens patriæ* than where the interests of private litigants alone are involved. The statute enables the Government, although not a party, nor in general subject to be made such, to intervene without prejudice and to invoke that doctrine.

Government Property May Not Be Attached.

"It is especially significant that Section 3753, which is, of course, a part of the supreme law of the land and binding throughout the Union, expressly refuses to recognize any right whatever to seize or attach property of the United States, or property held, owned or employed by it. . . . While, however, it is not to be doubted for a moment that the United States is entitled to the undisputed possession and control of its property, and of property in which it is interested to the extent of that interest, and that this possession and control are exempt from the process of every court, yet, in order to avoid unseemly clashing and hostile demonstration upon the part of the creditors or claimants, with the beneficient disposition which has always marked its policies toward the people, Congress, by the act of 1864, provided an orderly and peaceful solution of controversies that may arise between parties claiming adverse to the United States, under the terms of which the utmost rights of all claimants are preserved without the functions of the Government being in the slightest degree disturbed. . . .

"The nature and necessity of the subject, the sovereign claim and interest, the object to be gained, the words of the statute, all convince me beyond doubt that the 'stipulation to be entered into' is an engagement on behalf of the United States which shall be addressed to and filed with the particular court under proper reserve of submission to the jurisdiction, whereupon discharge of the property as matter of course would follow, and adverse claimants would have the opportunity of establishing, in accordance with the law, their respective claims against the bond of indemnity thus provided."

The Case of the "Galveston."

Referring directly to the case of the "Galveston," the Attorney-General says:

> So here I cannot doubt that the stipulation, when presented and entered into as the engagement of the United States, will operate forthwith to discharge the property and free it from the State jurisdiction, that the Chancery Court of Virginia, upon the entry of this instrument and consideration of the law so invoked, will take whatever action may be necessary or desirable to conform its records to the supreme law and to prevent any clash of authority.
>
> One further point remains to be considered. The letter of the Secretary of the Navy requests to be authorized to employ, if necessary, the military force of the Government at his disposal for the execution of his orders in the premises. I am loath to believe that occasion for such exertion of the Federal powers will arise, being confident that any claim to interfere with the national rights under the judicial authority of the State of Virginia will be promptly disposed of and denied by the Chancery Court. For this reason I shall defer answering that question.

Following the Attorney-General's reasoning, it is assumed by the officials of the Nevy Department that in case delays occur in the construction of war vessels now building in other private shipyards, steps will at once be taken to seize them and complete them either at Government yards or at other private yards on supplemental

contracts. Should the liens and attachments of creditors be encountered in any case, the Government will offer to file stipulation and bond to indemnify the creditors up to the amount of the difference between the payments made by the United States and the value of the vessel when seized. It is assumed that no difficulties will be encountered in inducing the courts to accept the stipulations and bonds, but the Department will still reserve the right to seize the vessels in case the Government's paramount title is disputed. W. L. C.

Canadian Notes.

Higher Steel Duties to Benefit Britain.

TORONTO, June 20, 1903.—Advocates of higher protection on Canadian iron and steel say that its unfavorable effects would be chiefly against the United States and that it would be actually beneficial to Great Britain. Under the present tariff there is a very large importation of iron and steel, most of it from the United States, some of it from the United Kingdom. By doubling the duty the Government would greatly reduce the volume of that import trade to the advantage of the home producers of iron and steel. But while the whole supply from outside sources would thus be cut down, Britain's sales here would, the protectionists maintain, be actually increased. They calculate that the working of the preference would bring that about. They argue that the present tariff is so low that it is no barrier to the selling of American iron and steel in Canada, and that it will scarcely be felt as an obstacle when overproduction becomes fairly started across the line. To the British the preference can give no advantage, it is held, until it is more substantial. Practically it is considerable, but then the whole of which it is a part is small. Take the duty on billets, for example. It is $2 a ton. Thirty-three and one-third per cent. of so small a duty on so heavy a commodity cannot equalize conditions between the over sea British steel maker and the next door American maker. But if the general duty were made $6 a ton then the preference would be material. A discount of one-third in favor of the British manufacturer would mean an exemption of $2 a ton instead of, as at present, 66 2-3 cents a ton. A steel man puts the matter this way:

There is only one way in which the British preference as regards the steel and iron industry can be made of real value to England. This is by adopting a tariff approximated to that of the United States, giving England from 33 1-3 to 40 per cent. preference. Take, for instance, England's present position under the preference in the matter of steel rails. These rails are admitted free from all countries, and the effect of the preference is *nil*.

In structural steel over 35 pounds per yard the present duty is 10 per cent. The preference of one-third does not amount to more than a cash discount of 3 per cent. If the American tariff of $10 per ton on structural steel was adopted in Canada, England, under the one-third preference, would be in an infinitely better position to take any surplus orders Canada may have to give, and these orders should be considerable for some time to come.

The position is the same all through the iron and steel schedule, from pig iron to the highest finished article. Canada is buying and must continue to buy her surplus requirements from the three great producing countries, England, the United States and Germany. Place the tariff approximate to that of the United States against all countries, giving England one-third preference, and Canadian industries will receive a healthy impetus while England will receive the bulk of our surplus orders.

Dominion Iron & Steel Company.

J. H. Plummer, vice-president of the Dominion Iron & Steel Company, returned to Toronto a few days ago. He and Frederick Nicholls, another Toronto director, made an examination of the company's steel plant and of the property of the Dominion Coal Company, which the Iron & Steel Company hold under lease. The joint report of Mr. Plummer and Mr. Nicholls was communicated to the directors at an informal meeting in Montreal. Its details have not been given out to the public, but Mr. Plummer summarizes them as follows:

The iron and steel plant is at last in a position to produce its large output of iron and steel profitably, when the finishing mills are completed, provided that reasonable protection is granted. The coal property, allowing for the fire in No. 1 and the strain to keep up a compensatingly larger output at the other collieries, is in good shape, with excellent prospects and an absolutely certain future.

He added that the financial arrangements now under consideration, which it is hoped will be completed shortly, will put the company in a position to press forward the completion of the finishing mills and to work the whole plant to the best advantage; also that the steel turned out appears to be of excellent quality and to give entire satisfaction.

A meeting of the directors of the Dominion Iron & Steel Company was held in Montreal on Thursday to take up the future policy of the company and their relation with the Dominion Coal Company. There was an almost continuous session, from early in the day until 6 in the evening. They met again on Friday. It is understood that they presented to the Government such a statement of the company's situation as had been asked for by the Premier and the Minister of Finance. There is a general expectation that something will be done in the way of protection. The feeling seems to be that a higher bounty rather than additional duty will be granted.

Nova Scotia Steel Company.

The directors of the Nova Scotia Steel Company also met in Montreal on Thursday. The fact that the boards of both the steel companies of Nova Scotia were in session on the same day and in the same city gave rise to rumors that they were discussing amalgamation or some other arrangement for closer relations. To this rumor the presence of Mr. Whitney, a Dominion Steel director, at the Nova Scotia Company's meeting, gave some further appearance of possible truth. But the story has been denied by officials of the companies.

The Nova Scotia Steel Company directors authorized the payment of the quarterly dividend of 2 per cent. on the preferred stock on July 15. A deputation was appointed to wait on the Government with a resolution favoring a readjustment of the Bounty act with respect to pig iron. J. F. Stavis, the president, and Thomas Cantley, the managing director, were on this deputation which went to Ottawa on Friday. They asked the bounty on the pig iron product from foreign ore to be placed on the same level as that for the product from domestic ore. They also urged an increase in the duty on billets.

C. A. C. J.

The manufacture of cement from blast furnace cinder has attained enormous proportions in Germany, the annual output being nearly 2,000,000 barrels; it is called "Iron-Portland" to distinguish it from the true cement in general use, for it possesses some qualities that render it unfit for all classes of work. It sets very slowly for one, but is free from great changes of volume for another. The time required for complete setting is nearly a month, but when it finally becomes solid it has greater strength than Portland cement. The best results, however, are not reached for several months. In this connection the origin of the term "Portland" to cements of this type is interesting. Herr Jantzen says in *Stahl und Eisen*, that it was first applied to Aspdin's cement made in 1829, because of its close resemblance to Portland stone, but this is not generally accepted. The best qualities of iron slag cement appear when used in connection with true Portland cement; when mixed half and half the union gives a cement which solidifies very nearly as soon as Portland alone; after 28 days had elapsed in one experiment the strength of the mixed and the natural materials was practically the same, but when 180 days had passed the mixture of slag and Portland was 50 per cent. stronger than the latter alone.

The Walworth Mfg. Company, Boston, Mass., who are well known to the trade from the variety of tools and supplies for steam fitters and plumbers which they manufacture, have added to the line of goods which they have heretofore made by taking up the manufacture of locomotive injectors, and have issued a descriptive catalogue giving full information and prices on these goods. The book is so written as to be invaluable to master mechanics and those who have charge of the motive power and steam plant of any enterprise. It will also aid the engineer in determining the parts and arrangements of the injector when ordering repairs. The company desire to place copies of the catalogue in the hands of all who will be interested in it.

The Iron Age

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DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS.
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A Theory of Industrial Depressions.

In the *Quarterly Journal of Economics* L. M. Keasby suggests a theory of industrial depressions which, like all thoughtful studies of questions of deep public interest, merits consideration. If it were possible to formulate a natural law of oscillation in the scale of business activity it would be invaluable, since it would permit a clear recognition of symptoms indicative of increasing or diminishing prosperity, and thus permit the taking of measures tending to the maintenance of something as near a stable equilibrium as the unconquerable speculative propensity of mankind would permit. Among those who study the subject there is a tendency to confuse cause and effect which is misleading and has led to many erroneous conclusions. Mr. Keasby may not have wholly escaped this pitfall; but he at least suggests a new thought, which is something of a distinction, in view of the voluminous literature of the discussion already existing.

The writer assumes the existence of two classes of products, which he designates respectively producers' goods and consumers' goods. The difference between them is illustrated in the case of a shoe factory. Consumers' goods are shoes; producers' goods are machines, engines, tools and other elements of a plant for producing shoes. The value of the shoe factory depends upon the margin found to exist between the average cost of shoes per pair and their average selling price. If shoes cost to make an average of $2 per pair and sell at an average of $2 per pair, the plant to make them is obviously without value, except as scrap, since it cannot be run with profit to its owners, and through deterioration must soon cease to be productive unless sustained for purely sentimental reasons, and at steadily increasing loss. Assuming that it has the capacity to turn out 100,000 pairs of shoes per annum, that these shoes, which cost $2 per pair, will sell for $2.25, and that this sale value is believed to be measurably permanent, the plant will show earnings of $25,000 per annum, and on a 20 per cent. basis will probably be valued at $125,000. If the price of shoes should rise to $2.50 per pair, and this rise was believed to be permanent, the value of the plant would be doubled. In the same way a decline of one-tenth in the value of the product would reduce the value of the plant one-half, while a decline of one-fifth would destroy its value altogether. From this the writer concludes that it may be stated as a general law that a slight fluctuation in the value of product tends to produce what would appear to be a violent fluctuation in the value of the plant producing it. Stated in terms yet more general, the value of producers' goods tends to fluctuate much more violently than the value of consumers' goods. We quote the author as follows:

> The law is capable of still further extension when we consider that producers' goods are themselves produced by other productive agents. The different parts of the shoe factory of the above illustration were produced in other factories, and the fluctuations in the value of the shoe factory would tend to produce still more violent fluctuations in the value of the establishments producing its different parts, for the same reasons as were given above. The law might therefore be extended so as to read: The further removed the producers' goods are from some consumable product, and the more remotely their value is derived from that of some consumable product, the more violent the fluctuations in value tend to be.

To discover in this set of assumptions the basis of an economic law would seem to involve a somewhat lively exercise of the imagination. The difficulty is that the facts have not been correctly observed, and do not appear to warrant the conclusions which Mr. Keasby has drawn from them. The illustration of the shoe factory will serve as well as another, but invites handling in a somewhat different way from that which the writer has chosen. Assuming that $2 per pair is the basis cost of shoes, an advance to $2.25 in the selling price would greatly stimulate production, and one to $2.50 still more so. In such circumstances there would be a great demand for machines, tools and everything entering into the mechanical equipment of shoe factories; and as the business would be very profitable, those engaged in it would be likely to accumulate a considerable surplus of capital available for improvements. If subsequently the average selling price of shoes should decline from $2.25 or $2.50 to $2, and enterprising manufacturers found themselves confronted with the prospect of continuous loss, they would suspect a reason for this in the ability of other manufacturers to produce more cheaply than they. Their first step would be to invest some of the accumulations of prosperous years in new machinery and better appliances, with the result that much old machinery would be replaced by new, and the makers of producers' goods would find their facilities taxed to the breaking point to meet the new requirements of shoe factories which, if the selling prices of shoes had remained constant at one-ninth to one-fifth above average net cost, would have considered themselves fully equipped and under no necessity of replacement or betterment, and would have limited their purchases of producers' goods to such new plant as they could make room for without displacing any part of the old plant. Mr. Keasby seems to have a glimmering understanding of this, but we cannot accept his view of the process by which congestion and stagnation are reached. He says:

> A slight rise in the price of consumers' goods will so increase the value of the producers' goods which enter into their production as to lead to larger investment in producers' goods. The resulting larger market for producers' goods again stimulates the production of such goods, and withdraws productive energy from the creation of consumers' goods. This for the time tends to raise the price of consumers' goods still higher, and this again to stimulate still further the creation of producers' goods. There is no check to this tendency until the new stocks of producers' goods begin to pour upon the market an increased flow of consumers' goods. This tends to produce a fall in their value, which in turn produces a still greater fall in the value of producers' goods, and so the process goes. There seems, therefore, to be a fundamental reason for the periodicity of industrial depression, which can only be removed by such a complete knowledge and understanding of the situation as would enable the business world to foresee the tendencies and take measures to overcome them.

In the light of this theory we shall have to revise our economic axioms, and start with the assumption that the end and aim of human endeavor is not abundance, but a supply so restricted and guarded against superfluity that an artificial scarcity shall at all times interpose between the consumer and the gratification of his desires, to the end that he shall always be willing to purchase at prices insuring the producer a satisfactory profit, without much effort to encourage and increase consumption by producing more cheaply. It will also be necessary to accept the proposition that in proportion as goods of universal utility become cheap the consumption falls off, which is not wholly in accordance with experience.

As a matter of fact, the changes of the last few years,

tending steadily in the direction of what Mr. Carnegie has happily designated co-ordination, have given us a series of entirely new economic postulates, which confuse statistics and silence prophecy. We do not yet know just how to formulate them, nor exactly how to argue from them. There is good reason to believe that panics, followed by periods of industrial depression of greater or less duration, were formerly due to causes rather psychological than material. We used to talk about the unsettlement and the re-establishment of confidence as causes of the variations in the curve of national prosperity. This correctly noted the condition of public opinion at a given moment, but explained nothing, since it was impossible to tell why confidence gave place to distrust and distrust to confidence. Either condition was the resultant of infinitely complex and counteracting forces, beginning in causes so remote and untraceable that the search for them led nowhere.

Shrewd financiers, with large resources of capital at command, seem to have concluded that the unsettlement of confidence can be averted if it is not permitted to gain headway. The bankers were the first to realize that panics began in distrust of the banks. If one of these institutions was permitted to get into difficulties, conditions were produced which might extend to the whole financial system and pull down perfectly solvent institutions in the common wreck. The result is that if a bank finds itself in difficulty it does not have to put up the shutters, thus starting a panic; but it quietly notifies the members of the proper committee of the clearing house. If its collateral is good and its basis sound its loans are assumed by the other banks, and its replenished cash resources are made sufficient to meet all demands. This may happen 100 times for every once a rumor gains currency that a bank is asking assistance. Indeed, it has become a feature of our banking system, and a very valuable one. The credit of a bank doing a legitimate business and conforming to the rules of sound banking is practically sustained by the pledge of the entire banking capital of the country. There is no altruism in this; it is simply good business. It enables the banks which carry manufacturing accounts to deal liberally with their customers, and to tide them over points of difficulty, so long as the conditions warrant it. The same is true of commercial accounts. It may be said with confidence that during the past three years there have been a great many occasions when under the conditions existing ten or even five years ago we should have stood in imminent danger of a disastrous panic, to be followed by a period of protracted commercial and industrial depression had the tocsin been permitted to sound.

Industrial consolidation may also be assumed to have accomplished something in the way of preventing the congestions of manufactured goods which formerly occurred, creating the condition erroneously described as "overproduction." To what extent this will be effective in insuring exemption from periods of industrial depression cannot yet be known. Until we do know it will be dangerous to attempt to formulate laws which are intended to explain what may never again happen. The existence of a state of industrial and commercial paralysis cannot possibly be in obedience to any natural law, but rather indicates that some natural law has been violated, and that a condition has been produced which is artificial and abnormal. In this view of the matter it seems scarcely worth while to waste ingenuity in formulating a theory of that which should not happen, and may never again happen in just the way in which we have learned from past experience to expect it.

The Decadence of the Scotch Warrant Trade.

Attention has been quite frequently called to the decline in the traffic in Scotch pig iron warrants. The stocks of pig iron carried in the public stores in Scotland have been diminishing steadily for a long time, until the quantity has become so small that the movement of warrants is now insignificant. For over 40 years, or down to about 1890, transactions in Scotch warrants had been on so large a scale that they exerted great influence on the iron trade of the world. During that period it was as desirable for those in the iron business to keep themselves posted on the ups and downs of the warrant market in Glasgow as for our financiers to keep in touch with affairs on the New York Stock Exchange. It was the day of the merchant, when the iron trade was dominated by those who bought and sold and not by those who manufactured, as in these modern days. The introduction of the use of pig iron warrants began at a time when the world's production of iron was small, and so little steel was made that it was almost one of the precious metals. Far more iron was cast than was worked up into other forms, and foundries were therefore important establishments, while foundry pig iron was the leading product of the iron trade. But the blast furnaces were small and their owners were usually men of limited means, and foundries also were not large and the foundrymen were not financially capable of carrying sufficient stocks to supply their requirements far into the future. At that time, therefore, the producers and consumers of pig iron found the public storage yards a great convenience. The most prominent establishment conducting operations in the storage of pig iron was the firm of Connal & Co., Limited, Glasgow, Scotland. Their operations were on a gigantic scale, and they employed a large capital in the conduct of their business and utilized a large area of ground for storage purposes. For this reason a decision announced in their recently issued annual report is of more than ordinary interest.

The report states that the results of the past three years have been very unsatisfactory; so much so that for two years the dividends on the preferred shares have had to be paid for the most part out of the reserve fund. The stock of pig iron in their Glasgow stores is now only about 15,000 tons, with almost no prospect of increase. The directors therefore recommend that an effort should be made to realize on the large amount of capital at present locked up in land in Glasgow, no longer required for storage purposes, and the proceeds applied to the reduction and repayment of the preference capital. Some realizations of their property have already taken place, the company having erected dwelling houses on a portion of the land, which are believed to be a profitable investment. They still have, however, a large extent of grounds now vacant, on which pig iron was formerly stored in enormous quantities, and it is this land which they propose to sell. They suggest a reorganization of the company, hoping that the adoption of measures to utilize their property will provide a sufficient income to continue the payment of dividends on their stock.

The practical abandonment of the storage warrant business by this great company has naturally brought out interesting comments in the English newspapers. From these we learn that the system of storing pig iron dates from 1841. In that year speculators in the North of Ireland purchased some Scotch pig iron, and while willing to pay for it had no desire to take delivery in monthly quantities, as was then the custom. Under the circumstances their only security was the promise of the maker

to deliver the iron. Being in perplexity, and perhaps also doubting the maker, they consulted William Connal & Co., who had negotiated the purchase for them. Connal & Co. were produce merchants, established in 1826, holding the Government monopolies for all tobacco and fancy woods entering the Clyde. They agreed to take delivery of the pig iron for their customers and it was put into a yard where fancy wood was stored. Other lots of iron were similarly intrusted to the firm. The practice of thus storing iron proved very convenient and it rapidly developed. At first the iron belonging to each client was isolated, and as the lots deposited or withdrawn increased in number some confusion resulted, notwithstanding the large area of land thus utilized. It was therefore decided that all iron of the same quality should be placed in one large pile, abandoning the idea of identifying each lot of iron by its owner's name. Thus, in 1843, the business of pig iron storage was methodically started and the firm of M. & W. Connal & Co. were specially formed to handle the business, changing to Connal & Co. in 1864 and to Connal & Co., Limited, in 1881. A standard was established by the selection of certain good brands of iron, and the quantity or unit of 500 tons was fixed for the issue of a certificate or warrant. The iron had to be delivered into the yards in the proportion of 300 tons of No. 1 quality and 200 tons of No. 3 quality. The brands selected were covered in the warrants by the terms "Good Merchantable Brands," which were abbreviated into "G.M.B." The certificates thus issued became as negotiable and transferable at the prices of the day as stocks or shares, and from time to time proved favorite investment securities both for iron manufacturers and outside capitalists. The cost of storage was 1 penny, or 2 cents, per ton per month.

The facilities provided through Connal & Co. for the immediate, rapid and unquestioned conversion of their production into cash enabled the Scotch pig iron makers to maintain their hold on the industry in spite of the gradual exhaustion of the native ore which first gave Scotland precedence in the pig iron trade. The accumulation of immense stocks made Glasgow the center of the iron trade, because it held the world's reserves of the metal. That was in the old days, when the stocks represented a considerable and even the larger portion of the annual production. It was also in the days when the means of transportation were much less comprehensive and rapid than at present, and it was much more desirable to have a large reserve from which a supply could be drawn. The records of the stocks of pig iron thus held at the close of each year, and the comparison which these stocks bear to the production of Scotch pig iron during the year, are exceedingly interesting from a historical standpoint. The earliest record of Connal's stocks at hand is that for 1853. The following table shows the most important yearly figures from that date to the close of 1902, the years omitted showing gradual advances or declines, as the case may be:

Year.	Stocks December 31. Tons.	Production in Scotland. Tons.
1853	216,000	740,000
1856	90,000	820,000
1857	196,000	920,000
1863	763,000	1,080,000
1866	510,000	994,000
1870	663,000	1,206,000
1872	194,000	1,090,000
1874	96,000	806,000
1875	170,000	1,050,000
1880	739,000	1,049,000
1885	1,050,562	1,003,562
1888	1,244,433	1,027,774
1890	613,445	798,333
1895	346,003	1,096,912
1899	245,258	1,166,838
1900	71,300	1,153,960
1902	24,000	1,295,000

It will be seen from the above table that in the year 1856, which was a year of great activity in the iron trade, the stocks were sharply reduced. They then steadily increased, year by year, until 1863, from which time they declined almost continuously until 1874, when the quantity held fell below 100,000 tons, the record for that year remaining the lowest for 25 years. In 1875 the reaction began, which led to an accumulation of stocks unknown before or since. In 1885 the stocks covered by warrants first exceeded the annual production in Scotland, and in 1887 the excess of stocks over the year's production was no less than 295,800 tons. The high water mark of stocks was reached in 1888, after which a reduction of the output and an increase in the demand steadily cut down the accumulation. Since the opening of the present year the stock has been further reduced to about 15,000 tons, although the production is running at about the same rate as last year.

The firm also established a warrant yard at Middlesbrough, England, for the purpose of conducting a similar business in that district. But although the production of pig iron in the Cleveland district, in which Middlesbrough is located, is nearly three times that of Scotland, there never has been a corresponding accumulation of stock in the Middlesbrough stores. The stock there held in 1880 was 147,000 tons, and it rose to 343,000 tons in 1888, but at the end of 1902 it was only 121,000 tons, although it is now nearly 143,000 tons. Most of the iron now in the Middlesbrough stores is asserted to be held by Americans or on American account.

Merchants and brokers in Glasgow held their early meetings in the Royal Exchange of that city, and bought and sold Connal's warrants since 1843. In 1880 they formed an association for the special purpose of dealing in iron warrants. For many years the dealings through this association were of very great importance. Many manufacturers having heavy contracts for the delivery of their product purchased warrants as a protection against a possible increase in price. It thus served a useful purpose to some extent. In connection, however, with these legitimate transactions a business sprung up which was largely speculative, and the speculative element was probably a more powerful influence in shaping warrant prices than the dealers in warrants who represented the legitimate trade.

The revolution in the world's iron trade which has occurred in the last 25 years is responsible for the decadence in the warrant trade. Foundry pig iron is no longer the leader. Steel has largely displaced iron. Scotland now ranks among the small pig iron producing countries. Great improvements have been made in facilities for transportation and for the transmission of intelligence. Both producers and consumers of iron are more generally in possession of ample capital than in the old days. Except at such an extraordinary time of interference with railroad transportation as occurred last year, the consumer of pig iron is able to secure a supply within a very reasonable period after placing an order. The passing of the Scotch warrant business is simply one of the incidents of the revolution.

The annual report of the State Mine Inspector shows that the production of coal in Ohio for the year 1902 broke all records in the State, aggregating 23,929,267 tons, an increase of 3,607,977 tons over the preceding year. Ohio regained third place that year among the coal producing States, having for several years previous been outstripped by West Virginia.

The twentieth annual convention of the American Institute of Electrical Engineers will be held at Niagara Falls, N. Y., from June 29 to July 3.

CORRESPONDENCE.

A Question on Making Cost Estimates of Iron Castings

To the Editor: A superintendent and cost clerk differ in opinion as to the proper valuation, when making cost estimates of iron castings, to be given the gateways, &c., coming from previous heats and used in making up the cupola charge.

In each heat some Eastern and Western iron is used, costing, say, $25 per ton; also some stove plate costing 62½ cents per hundredweight, and a quantity of gateways, &c., accumulated from previous heats. Each heat is debited with all the metal melted, including gateways, &c., and credited with the gateways and scrap left over, the balance standing for the net metal cost of the good castings secured.

"A" claims that the gateways, &c., should be classed as scrap metal and valued at 62½ cents per hundredweight, the cost price of stove plate scrap.

"B" claims that they should be valued at the average cost of all the purchased metals used, including in the calculation the high priced new metals at $25 per ton, as well as the stove plate at 62½ cents per hundredweight.

Who is correct? No shrinkage, labor, fuel, &c., is taken into consideration. Yours truly,

BEELZEBUB.

We shall be glad to print the opinions of readers of *The Iron Age* on this question.

EDITOR *The Iron Age.*

Siloxicon.

To the Editor: The descriptions of the new refractory substance, siloxicon, that have recently appeared in the newspapers have created such a widespread interest, as evidenced by the numerous inquiries received from all parts of the country and all lines of industry, that it is desirable to correct a statement that was contained in these publications.

It was there stated that siloxicon was inoxidizable, but recent investigations have shown that this is not true. When it is heated to or above 2674 degrees F. in an atmosphere containing a large amount of free oxygen, decomposition occurs.

Siloxicon, while variable in composition, may be represented by the formula Si_2C_2O, and when heated, as above stated, in presence of free oxygen, decomposition takes place, probably in accordance with the following equation: $Si_2C_2O + 7O = 2SiO_2 + 2CO_2$.

If the siloxicon be in the form of a brick or other molded mass the reaction occurs on the surface, producing a vitreous glaze, which in most instances is tinged light green from the presence of iron.

In the absence of free oxygen or in a reducing atmosphere no such decomposition occurs, and the temperature may be raised to the point of the formation of carborundum, or, approximately, 5000 degrees F., before any change occurs, and then it takes place, it is thought, in accordance with his equation: $Si_2C_2O = SiC + Si + CO$. Solid carborundum remaining, while the vapors of silicon and carbon monoxide are given off.

It is interesting to note that after having discovered this oxidation of siloxicon, tests were made with carborundum, and it was found to be affected in a manner exactly similar to siloxicon: this notwithstanding the fact that for more than 12 years it had been generally considered inoxidizable. EDWARD G. ACHESON.

NIAGARA FALLS, N. Y., June 18, 1903.

The American Society of Mechanical Engineers.

SARATOGA, N. Y., June 24, 1903.—(*By Telegraph.*)—The forty-seventh general meeting of the American Society of Mechanical Engineers convened on Tuesday evening at the United States Hotel, over 350 members being in attendance. In a brief and very happy speech Albert L. Rohrer, chairman of the local committee, welcomed the visitors. President James M. Dodge replied in behalf of the society. Three professional papers were then read.

The first was a description by J. M. B. Scheele, of the United States Army, of the gun factory at the Watervliet Arsenal. This arsenal was established in 1813 as a military establishment, principally for the manufacture of field, siege and seacoast carriages. Work of this kind was continued until 1887, when the gun factory was inaugurated. In that year a shop was especially equipped for the manufacture of field and siege guns, which is a distinct and separate department from the seacoast gun shop. The demand for seacoast guns of large calibers necessitated the erection of a shop exclusively for this purpose. A building 1000 feet in length was erected. The north wing, with the central section, 130 x 600 feet, was completed and in productive order in 1890. The south wing, 150 x 400 feet, assumed its activity in 1895. The seacoast gun shop is equipped with about 40 lathes, classified as gun lathes, jacket and hoop lathes, which are capable of handling guns up to 16 inches in caliber. Of the lathes four have a capacity to take in assembled 16-inch guns.

A large number of modern standard machine tools are used for the making of the breech mechanisms which are fitted to each gun. The metal employed in gun construction is low carbon steel, melted by the open hearth process and cast into suitable ingots at the works of the manufacturers. The forgings as received at the army gun factory are tempered, annealed and rough machined all over. Approximately 20 to 25 per cent. of the metal is removed by the various tools and appliances at the gun shop for producing the finished gun. Of the five overhead traveling cranes in the shop, the largest has a capacity of 130 tons. It is the usual practice to convey material and assembled guns exceeding 5 tons in weight by these cranes and transport lighter pieces by means of shop trucks and the hoisting facilities in the side aisles.

The approximate output of the large gun shop per year is 10 5-inch, 13 6-inch, 16 10-inch, 16 12-inch guns and 20 12-inch mortar guns, or their equivalent, and the capacity of the small shop about 175 field guns, 10 5-inch siege guns, 11 7-inch mortars and 10 7-inch howitzers, thus aggregating a total of 281 guns per year. These figures are based on working one shift of eight hours per day. Other papers at this meeting were by R. P. Bolton on "Tests of Hydraulic Elevator Plant," and by J. B. Blood on "Rational Train Resistance Formula."

At the business session on Wednesday morning the reports of the tellers and committees were received. A finished report by the Committee on the Proposed Constitution, By-laws and Rules was handed in, and it was voted to send copies to members for a special ballot. One of the most important actions of this session was the unanimous adoption of resolutions offered by Fred. W. Miller, being the first definite action taken by any of the interested societies toward the proposed gift of Andrew Carnegie. Other societies have discussed the question of a union building, but only as individuals and not in any general convention. The resolutions follow:

The American Society of Mechanical Engineers, in general session at its forty-seventh meeting in Saratoga, N. Y., has learned with the greatest interest of the proposed gift to the profession of engineering by Andrew Carnegie, member of the society, of $1,000,000 for an engineering building. The society has also been informed of the action taken by its Council in reference to making this gift available and serviceable to the needs of the society.

Wherefore, be it resolved, That this society desires to place on record its appreciation of the purpose of Mr. Carnegie in seeking to advance by this means the interests of the profession of engineering.

Resolved, That by embodying this purpose in the form of a great and noble building for the uses of the organizations whose aims are to foster the development of engineering, the donor has taken a step which will notably advance those interests.

Resolved, That the society approve the prompt response of its Council to the opportunity offered to favor and further the interests of the society which are involved in that progress of the profession which lies at the base of the Carnegie gift.

Resolved, That it be referred to the Council, with power to transmit by cablegram and letter to Mr. Carnegie the action of the society and to carry out by fur-

ther action the details necessary to realize Mr. Carnegie's generous purpose.

The following figures, which are of value as showing the feeling of the members of the society toward the metric system, were obtained by letter ballot: In favor of the adoption of the metric system as the only legal standard in the United States, 103; against such adoption, 363. In favor of the adoption of H. R. bill No. 2054, 95; against the bill, 342. In favor of legislation which would promote the adoption of the metric system, 154; against such legislation, 311. The substitution of the metric for the English system would be detrimental to my business, 343; would not be detrimental, 145. While it should be stated that only 514 ballots were returned, or about one-quarter the total membership, this percentage probably is indicative of the general feeling upon this question.

Labor News.

BRIDGEPORT, CONN., June 23, 1903.—The strike of machinists at Bridgeport, Conn., remains unchanged. The men are at work in all the shops, with the exception of those of the Yost Typewriter Company and the Pacific Iron Works, and in those shops the places of a few of the strikers have been filled. It is stated that these two shops expect to bring their force up to a full complement in a few days.

SPRINGFIELD, MASS., June 23, 1903.—The strike of the molders at Springfield, Mass., has been declared off, and all the men have returned to work at the foundries of the Baush Machine Tool Company, the Confectioners' Machinery & Mfg. Company, Springfield Foundry Company and the Davitt Foundry. The strike was on the plain issue of nine hours. The employers did not grant the demand. The ten-hour rule will remain in force, but the employers have agreed to endeavor to shorten the day's work. This will in reality effect no change, because the average time of pouring off has been such as to make the day one of less than ten hours, and where a man worked the lesser time he received his ten hours' pay just the same. At Holyoke, Mass., the molders have made a demand for a nine-hour day with $3 a day, which is an advance of 25 cents. The time limit set in the demand was July 1, while in Springfield it was June 1.

PHILADELPHIA, PA., June 23, 1903.—Conferences to adjust the differences between the foundrymen and molders here and in adjacent territory are being held, as we go to press, at the Hotel Walton. Local representatives of both organizations have for some time been trying to adjust the wage question without success. Representatives of the National Founders' Association and the Iron Molders' Union reviewed the matter in joint session, beginning on Monday, the 22d inst., after which the question was left in the hands of the following committee for settlement and arbitration: Representing the National Founders' Association: Antonio C. Pessano, chairman, Detroit, Mich.; Willis Brown, Erie, Pa.; John A. Penton, Cleveland, Ohio. Representing the Iron Molders' Union: J. F. Valentine, chairman, Cincinnati, Ohio; W. F. Perrine, New York; Geo. Kempt, Philadelphia, Pa.

The iron molders ask for a reduction from ten to nine hours for a day's work and an increase of 10 per cent. in wages.

The Eastern Bridge & Structural Company have filled the places of the structural workers in their shops at Worcester, Mass., and business is going on as usual. The incident is considered ended as far as the company are concerned.

The brass workers' strike at the plant of the Glauber Brass Mfg. Company of Cleveland, Ohio, has been settled and 75 men have returned to work. The brass workers of Cleveland have been on strike for more than five weeks. Conferences are being held looking to the settlement of strikes in the plants of the Cleveland Bronze & Brass Company and the United Brass Mfg. Company, these being the only Cleveland brass plants where strikes now exist.

The prolonged strike at the works of Paulson & Eger, the Hecla Iron Works, Brooklyn, N. Y., is over. A number of the old employees are seeking reinstatement and some have secured their old places at the old terms. The profit sharing plan has been abandoned.

PERSONAL.

George V. Milliken of the Pittsburgh Mfg. Company and A. Howard Nelson of Nelson, Buchannan & Co., bridge builders, have been elected directors of the Metropolitan Bank in that city.

William B. Schiller, president of the National Tube Company, at Pittsburgh, has been elected a director and also chairman of the Board of Directors of the Lorain Steel Company, at Lorain, Ohio.

Thomas Pryde, superintendent of machinery at the Edgar Thomson Steel Works, Bessemer, Pa., sailed this week for Scotland on a two months' visit.

George Westinghouse of the Westinghouse interests, at Pittsburgh, has sailed for Europe.

L. C. Gage has been appointed general manager of the foundry and structural steel plant of A. Bolter Sons, located on the North Side, Chicago. The appointment becomes effective July 1. Mr. Gage has been connected with the Chicago branch of the Jones & Laughlin Steel Company for 18 years, and a greater portion of that time has been in charge of the structural steel department of the company. Mr. Gage has been the recipient of congratulations from a host of friends attracted to him during his long service in the iron and steel trade. R. H. Gage, son of L. C. Gage, who has just graduated from the University of Illinois with the degree of Bachelor of Science in Civil Engineering, has been appointed engineer for A. Bolter Sons, and will assume his new duties July 1.

W. T. Graham, president of the American Tin Plate Company, has returned from Europe.

V. A. Moore has been appointed one of the district managers of the Southern office of the American Iron & Steel Mfg. Company, Lebanon, Pa., with headquarters in Atlanta, Ga. Chas. P. King, formerly of the firm of King & Thornton, Atlanta, Ga., has also been appointed one of the district managers. E. E. Thornton, formerly of the firm of King & Thornton, has resigned his connection with that firm.

The Degree of Doctor of Science has been conferred by Columbia University upon Peter Cooper Hewitt, a son of Abram S. Hewitt.

Axel Blomfeldt of Blomfeldt & Rapp, Chicago, sailed for Europe recently on a three months' business and pleasure trip combined. The firm do a considerable foreign business in machinery.

H. H. Campbell, general manager of the Pennsylvania Steel Company, has been granted a three months' leave of absence, and will spend it in Europe, sailing on Wednesday, June 23.

Stephen W. Baldwin, who for over 20 years has represented the Pennsylvania Steel Company in New York as sales agent, will retire from active service on July 1, although he will retain his connection with the company in an advisory capacity. A. E. Aeby, who has long been connected with the New York office, will succeed Mr. Baldwin, and on and after July 1 will be the New York sales agent of the Pennsylvania Steel Company.

Franz Burgers, general manager of the Schalker Gruben v. Huetten Verein of Gelsenkirchen, and F. Sueltemeyer, manager of the Gewerkschaft Deutscher Kaiser, Bruckhausen on the Rhine, arrived in this country last week. They are making a tour of our iron works.

Wallace Buell, general sales agent of the Dominion Iron & Steel Company, has resigned. F. P. Jones, for years the Montreal representative of the company, and formerly with the Nova Scotia Steel Company, has been appointed his successor, with headquarters at Sydney.

James H. Baker retires June 30 from the position of general manager of the James H. Baker Mfg. Company of Pittsburgh, Pa., manufacturers of drop forgings, in order to devote his time to private interests.

Trade Publications.

Hydraulic Tools.—A comprehensive catalogue has been issued by the Watson-Stillman Company, 204 East Forty-third street, New York, on their hydraulic tools and miscellaneous machinery. This is in reality an illustrated index, each cut of which represents from 1 to about 20 sizes of tools, a full and complete description of which is kept by the company in the form of loose sheets to be distributed as required. These sheets are bound together in various combinations, to suit the demand of inquirers. Those asking about a certain machine, or certain line of machines, are by this means provided with just what they want and do not have to wade through a mass of reading matter in which they have no interest. The catalogue covers hydraulic jacks, punches, presses, benders, pumps, accumulators, riveters, fittings, valves, &c.

Friction Engines.—A circular has been received describing the double drum hoisting engine, with boiler, built by the Stroudsburg Engine Works of Stroudsburg, Pa. The friction drums have the well-known cone friction, which possesses points of superiority. This is due to the improved arrangement of the hard wood friction blocks and the manner of securing them. The drum is thrown into gear by forcing it against the wood friction surface by means of the screw, thrust pin, cross key and collar, the shaft is shouldered, to take the thrust on the gear, and a collar is screwed on the outer end to take the thrust against the bearing; the drum is forced out of engagement by simply throwing friction levers back against the stop pin, and the drums are free to revolve on the shaft. No springs are used to force the drums out of gear. The results are increased power, less wear and more rapid work.

Pump Valves.—The Branden rubber pump valves, made by the Crosby Steam Gage & Valve Company, Boston, will stand more than double the pressure of ordinary flexible valves. Imbedded in the valve is a wire coil, which adds greatly to the durability of the valve and insures its retaining its form for an indefinite period. They are especially intended for elevator, mine, brewery, fire, boiler feed and condensing pumps.

Electric Generators.—Bulletin No. 30 describes the latest form of direct current generators built by the Northern Electric Mfg. Company of Madison, Wis. The scope of modern engine generator practice is shown by the illustrations, running from Corliss equipments to generators built for connection to steam turbines. These generators are built in two separate and distinct types of frames—namely, the ring type and the spherical type. Each of these has been developed in such sizes and speeds as have been found most applicable to meeting the demands of the best engineering practice. The spherical frames are used exclusively for the smaller sized machines, the larger generators being of the ring type.

"Buffers and Grinders."—This is the title of the last catalogue by the Storey Motor & Electric Company of Harrison, N. J. In buffing and polishing service the spindle must be long in order that the insides of the pieces to be finished may be reached by the buff, whereas in grinding work there is no such requirement; hence the spindle is made short. In all these machines the spindle is the armature shaft extended. The motors are made dust proof and the bearings are so designed that the end thrust is taken care of. These machines are so proportioned that they will run at the high speed required without undue heating or sparking at the brushes.

Steam Boilers.—The business of the Charles River Iron Works, Edward Kendall & Sons, Cambridge, Mass., was started in 1860. Since then the output has steadily increased, new shops have been added, and the most modern and improved machines have displaced the old. The aim of the concern is to keep the quality of their work up to the highest standard. The horizontal return tubular boiler built by this company is made of the best materials and in the most workmanlike manner. It is quite common to punch holes for tubes, but that method strains the metal and makes it more liable to crack between the holes. In this establishment a ¾-inch hole is punched, which forms a guide for the drill, and then the tube holes are drilled with a double cutting drill. This does not injure the metal and does not necessitate annealing the heads, as should be done under the punching process. The ends of the tubes are beaded with a pneumatic machine, and a pneumatic machine with round nosed tool is used for calking wherever it is practicable.

Boring and Turning Mills.—Under the title "A Treatise on Boring and Turning Mills" the Bullard Machine Tool Company of Bridgeport, Conn., have prepared a catalogue dealing with the advantages to be derived from the use of vertical mills and explaining the class of work for which they are adapted. Since the boring mill is essentially a vertical face plate lathe, the company have endeavored to embody in the design all the characteristics of the lathe, to avoid the defects inherent to the horizontal construction, and to take advantage of the vertical position to make a more rigid and accurate machine. The defects of the lathe are considered to be the difficulty of setting and securing the work and the necessity of heavy overhanging parts. The superiority of the mill lies in the fact that the work rests upon a horizontal table, and that the total weight of table and work is taken on a large angular bearing, which gives greater rigidity and smooth cutting qualities.

Machine Tools.—A large catalogue has been issued by Louis Well Machine & Tool Company of St. Louis, Mo., are describing their wide line of engine lathes, upright drill presses, radial drills, &c. The company have recently made extensive improvements in their entire line of lathes. These are heavily built, but so nicely proportioned that their appearance is symmetrical and pleasing. They are powerfully geared, enabling them to do work of the heaviest kind rapidly and with ease, and at the same time are so conveniently arranged as to be equally well adapted to small work. One of the most important features is the patented universal screw cutting and feeding arrangement, which gives the full range of screw pitches without removing a single gear and enables the operator to change from one thread or feed to another almost instantly.

A circular by the Middletown Machine Company of Middletown, Ohio, contains much valuable information about gas and gasoline engines.

A pamphlet by the Haughton Elevator & Machine Company of Toledo, Ohio, describes standard styles of passenger and freight elevators. These are made in size to suit, either plain open cars or passenger cabs, of any design desired.

A pamphlet has been received from the International Motor Car Company of Toledo, Ohio, pointing out the advantages of their latest gasoline and steam driven cars. Their steam car carries four passengers, weighs 1300 pounds, engine is 7½ horse-power. With one charge of fuel and water it will run 75 miles, the fuel being either kerosene or gasoline.

The June Bulletin of the Holtzer-Cabot Electric Company of Boston describes their semiinclosed and completely inclosed motors. These are designed to meet the demand for a rugged and compact machine, readily adapted to special uses, such as application to various sorts of mechanical devices. They may be used either upon the floor, wall or ceiling.

"How Best to Light Our Country Homes and Resorts" is the title of a handsome catalogue by the Gilbert & Barker Mfg. Company, 82 John street, New York, describing the Springfield gas machine. Many illustrations are presented of residences and resorts using this system.

We have received a pamphlet describing the direct current dynamos and motors built by the Electro Dynamic Company of Philadelphia. Special attention has been paid in designing these lines in order that they may meet the most exacting conditions—that of marine use.

The Calculagraph is described in a pamphlet by the Calculagraph Company, 9 Maiden lane, New York. This machine mechanically subtracts the time of commencing work from the time of finishing and prints the difference, the elapsed time, in hours and minutes. It is the only instrument on the market that will do this.

Bids on the Gunboat "Paducah."

WASHINGTON, D. C., June 23, 1903.—The Judge Advocate-General of the Navy Department opened bids at noon to-day for the construction of gunboat No. 18, which will be known as the "Paducah." Proposals were received for this vessel and for the "Dubuque," a sister ship, on May 19, as the result of which a contract was awarded for the "Dubuque" to the Gas Engine & Power Company of Morris Heights, N. Y.; but as proposals for the construction of both vessels were not satisfactory, it was decided to readvertise the "Paducah." There were but two bidders to-day, their proposals being as follows:

The Gas Engine & Power Company, Morris Heights, N. Y., on Department's plans, delivered within 18 months	$355,000
The Townsend & Downey Shipbuilding Company, New York, on Department's plans, delivered within 18 months	377,000
—Or, in case the Roberts boilers are authorized	372,000

The lowest bid, which is that of the Gas Engine & Power Company, is $27,000 less than the appropriation available for the construction of this vessel. The same compnay have received the contract for building the "Dubuque," the price of which was $295,000, or $60,000 less than the bid for the "Paducah."

The specifications for the "Paducah" provide for a speed of 12 knots and a displacement of 1085 tons, with a length on low water line of 174 feet, extreme breadth of 35 feet, a mean draft of 12 feet, 3 inches at trial displacement and at full load about 13 feet, 5½ inches, and a total coal bunker capacity of about 200 tons. A feature of the vessel will be the composite hull built to a point of about 2 feet, 3 inches above the low water line amidship, above which line it will be entirely of steel. The outside planking will be of yellow pine sheathed with cold rolled copper. She will be equipped with two water tube Babcock & Wilcox boilers, and her battery will consist of six 4-inch rapid fire guns, four 6-pounder and two 1 pounder rapid fire guns and two Colt automatic guns. W. L. C.

MANUFACTURING.

Iron and Steel.

At the annual meeting of the Detroit Iron & Steel Company, Detroit, Mich., the following officers were re-elected: President, D. R. Hanna, Cleveland; vice-president, C. C. Bolton, Cleveland; secretary and treasurer, Charles W. Baird, Detroit; general manager, F. B. Richards, Cleveland. Silas Hitchcock, Theodore H. Eaton and Arthur M. Parker are on the Board of Directors.

The Youngstown department of the National Tube Company, Youngstown, Ohio, have just let a contract for pipe bending machinery which will greatly increase the output of the plant, making it possible for them to turn out sizes that have heretofore not been undertaken at the plant. The machinery will cost some $15,000 for installation, is being manufactured by the United Engineering & Foundry Company, and will make possible the manufacture of pipe up to 20 inches. At present the pipe manufactured at these works is from 1½ up to 16 inches.

The Empire Iron & Steel Company of Niles, Ohio, manufacturers of wrought iron and steel sheets, are building a large warehouse, which will be of steel frame construction, with corrugated roofing and siding. The company are enjoying large trade in their strictly genuine wrought iron sheets for roofing and siding, and also in their electrical sheets.

The stockholders of the Burden Iron Company met June 17 and elected the following directors: James A. Burden, I. Townsend Burden, John L. Arts, James A. Burden, Jr., Williams P. Burden and Arthur S. Burden. The directors met and elected these officers: President, James A. Burden; vice-president, James A. Burden, Jr.; general manager, John L. Arts; secretary, Nicholas J. Gable.

The report that Aetna Furnace, at Aetna, Ala., was to be started up is erroneous. The stack has not been in operation for years, is old and out of date. The property of the Aetna Furnace Company, however, has been leased by T. T. Lewis of St. Louis and associates, who will operate it as a mining proposition. There are about 9000 acres of brown iron ore, with mining equipment, included in the deal.

The Pratt & Letchworth Company, Buffalo, N. Y., have completed the crucible steel plant addition to their work and commenced operations in it last week.

The Susquehanna Rolling Mill, at Columbia, Pa., has resumed operations after an idleness of several weeks.

June promises to be the best month of the year for the Steelton plant of the Pennsylvania Steel Company. The blast furnaces are turning out 900 tons of iron daily, and more than this amount is being consumed by the Bessemer department alone. The company have orders booked ahead for many months.

A new turn in one of the mills of the Logan Iron & Steel Company, at Logan, Pa., will be operated by a full crew of workmen from Lebanon, Pa.

The Cyclops Steel Company of Titusville, Pa., are operating full time, and orders to meet the capacity of the plant are being booked. The steel manufactured is almost entirely for tools and finds a market with the American Locomotive Company and the Pennsylvania Railroad Company, principally. During the week a shipment was made to France, and the field abroad is widening for this product.

The Central Iron & Steel Company, Harrisburg, Pa., this week began the structural work of their new open hearth building. The Pennsylvania Steel Company have the contract. The building will be 147 x 360 feet and 91 feet high and will be entirely of steel, the plans calling for about 1700 tons. It is expected that the plant will be ready for use by next December.

The two blast furnaces under erection by the Carnegie Steel Company at Donora, Pa., will soon be completed and will probably be ready for operation in July, or not later than August.

No. 2 furnace of the Clairton Steel Company, at Clairton, Pa., has been started. No. 3 stack at this plant will be ready for blast before long. Each of these furnaces has a daily capacity of about 500 tons.

The National department of the National Tube Company, at McKeesport, Pa., will close down on June 27 and will be idle until July 5, to make the necessary repairs and take stock.

The Kokomo Steel & Wire Company, Kokomo, Ind., have elected the following officers: President, A. A. Charles; vice-president, Albert A. Conradt; secretary, John E. Frederick; general manager, Thos. Harris. The company have not been able to keep up with orders by running day and night shifts at their two mills.

Announcement is made that the two plants of the Republic Iron & Steel Company, at Muncie, Ind., will be shut down for two weeks beginning July 1.

The American Rolling Mill Corporation of Chicago, owning a large plant at Muncie, Ind., have notified the Commercial Club of that city that unless a bonus of $30,000 is given the company will move to another city, where a site for a factory and a $50,000 bonus are offered. The plant has to be changed from a natural gas to a coal fuel basis and the $30,000 will help to defray the expense.

The new plant of the Liggett Spring & Axle Company, at Monongahela, Pa., is nearing completion and the company expect to start in August. The report that a number of their employees had been discharged is incorrect. None of the men were discharged, but a number were laid off temporarily, owing to the nonarrival of material for equipping new machinery. Most of this has been received and work is being pushed vigorously.

General Machinery.

The Peden Iron & Steel Company, Houston, Texas, have purchased the mill supply business of Howard Smith & Co., 110-112 Travis street, and are now occupying the building, where they will carry a larger and better supply than heretofore of mill supplies, engines, boilers, drilling outfits and oil well supplies.

The York Mfg. Company of York, Pa., will erect a large refrigerating plant at New Orleans.

Application for a charter for the Stehman & Coho Mfg. Company of Lancaster, Pa., will be made on Friday, July 10. The company will manufacture grinding machinery, lathes, watchmakers' tools, punches, dies and press work. The incorporators are Andrew S. Stehman, Edward S. Stehman and Frank P. Coho, all of Lancaster, Pa.

The Gainesville Iron Works, Gainesville, Ga., founders and machinists, whose plant was recently wrecked by a cyclone, are rebuilding on a larger scale. The machinery was not seriously damaged.

The recently organized Consolidated Press & Tool Company, 96-100 North Clinton street, Chicago, will build a complete line of sheet metal tools and power presses. As they expect to embody a number of new and valuable features, some of which will be patented, considerable time will be required for completing the drawings and patterns. As soon as they have the patterns completed it is their intention to erect a new plant in Chicago or vicinity and increase the capital stock, which is now merely nominal. Their present shop is not large, but is fitted up with the latest type of tools. The company will build only the highest grade of machinery and will use snap gauges wherever possible to secure uniformity of work. Several large orders for automatic machinery are on the books, which will keep the plant running full well up to the first of the year.

W. L. Brubaker & Bros., Millersburg, Pa., manufacturers of taps and dies, are putting in a new 100 horse-power internal fired boiler to increase the capacity of their works.

The Keystone Iron Works, Los Angeles, Cal., have incorporated with a capital stock of $50,000, fully subscribed. The first Board of Directors is composed of Richard, Jennie and May Livingston, Susie Thom and Mary A. Steinmeyer.

The Chisholm, Boyd, White Company, Chicago, have incorporated for the purpose of manufacturing machinery. The capital stock is $250,000 and the incorporators are H. M. Wolf, H. G. Miller and D. S. Trumbull.

The business of the H. C. Fish Machine Company, lathe manufacturers, at Worcester, Mass., will probably be abandoned as a result of the bankruptcy proceedings recently mentioned. It had been hoped that the company would be reorganized and the business continued, but later developments show that there are no indications that any one connected with the company intends to resume business.

M. McVoy, president of the Locke Steel Chain Company of Bridgeport, Conn., sailed Friday, June 19, for England, to assist the English corporation, the Locke Steel Chain Company, Limited, organized to manufacture the chain in Great Britain. The English corporation have a capital stock of £200,000. The organization has not been wholly completed, neither has the site for the shops been chosen. It is to assist in these final arrangements that Mr. McVoy is making his trip. Six presses for the manufacture of the Locke chain are almost completed at the shops of the V. & O. Press Company, at Brooklyn, N. Y., and they will be shipped to England to be installed at the shops there as the nucleus from which the business will expand.

The Bradford Machine Tool Company, Cincinnati, Ohio, have just let the contract for a new two-story brick extension to their present plant, of 65 x 90 feet. This extension will bring the rear of their manufacturing plant directly on the Cincinnati, Hamilton & Dayton Railroad tracks, and thus avoid cartage, as heretofore. The new building will give the company fully 50 per cent. additional productive capacity.

J. W. Durant & Son of Sparta, Wis., have purchased the Christman machine shops in Tomah, and will spend several thousand dollars in fitting them up for general foundry and machine work and the building of gasoline engines.

The Resek Machine Tool Company of Cleveland have purchased the entire ball manufacturing equipment of the Cleveland Ball & Screw Company. The new factory, which comprises two buildings, one 50 x 90 feet and three stories high and the other a 30 x 90 foot two-story structure, has the machinery in place for the manufacture of tool steel balls from ⅜ up to 4 inches. The company also manufacture a special

line of brass working machinery, two-spindle milling machines, key lathes, &c., as well as a power saw for general use.

Judge Kohlsaat of the United States District Court at Chicago has appointed Edwin C. Potter of Chicago receiver for the United States Locomotive Company, whose plant is located at Hammond, Ind. The assets of the company are in the neighborhood of $300,000, with liabilities unknown.

The Hussey Drop Forging & Mfg. Company of Cleveland have been formed by P. L. Hussey, formerly of Toledo, and a plant has been established on Axtell street for the production of drop forgings and automobile material.

The Eclipse Car Fender Company of Cleveland are buying considerable machinery and will manufacture their fenders, which heretofore have been produced under contract. They are in the market for a large buildozer and dies with which to produce the frames of their car fenders.

Taplin, Rice & Co. of Akron, Ohio, have voted to increase their capital stock from $150,000 to $250,000. Their business has nearly trebled in the past two or three years, while the capital stock has not been increased. The increased capital will be utilized in improving the facilities.

As the result of the assurance by the city council of Akron, Ohio, that additional fire protection will be given the plant, the Wellman-Seaver-Morgan Company of Cleveland have taken an option on 32 acres of land adjoining the plant of their Webster, Camp & Lane division in Akron. A large addition to the already extensive plant is contemplated and the matter will be definitely decided upon within a few days.

The Cleveland Pneumatic Tool Company are working a large force in their recently erected plant on Second avenue, Cleveland, Ohio, and they have about all the business they can attend to. They are building up a very handsome foreign business and are making shipments to France, Germany and England. A recent shipment to Germany included an outfit of 75 riveting tools and 25 chipping tools.

The Cleveland branch of the Marshall & Huschardt Machinery Company state that the month of June is showing a very marked improvement over the previous month, due largely to the settlement of a number of strikes that have been troubling manufacturers in that district. The Cleveland house recently sold a nice order of tools to the Wm. B. Pollock Company of Youngstown, including a 60-inch Pond planer and a 64-inch New Haven lathe.

The Ray Automatic Machinery Company of Cleveland have closed contracts for the erection of their new factory, to be located at Berea, Ohio, a short distance from Cleveland. The company manufacture special machinery and automobile supplies.

The Peoria Car Company of Peoria, Ill., have been incorporated with $1,000,000 capital stock by Alexander Hoyt, V. H. Burke, A. L. Jacobs and others of Cleveland. They will manufacture steam and electric cars. Equipment is being purchased and the plant will be built at once.

Power Plant Equipment.

Proposals will be received until July 22 at the office of the United States Engineer, Grand Rapids, Mich., for a steam plant for suction dredge.

It is announced that the Greenfield, Mass., Electric Light & Power Company will establish a power station at Gardner Falls to develop 600 horse-power. It will be necessary to build a dam to develop the full power of the falls.

The International Railway Company of Buffalo, N. Y., have just awarded contracts for the equipment of a new power transformer house on the corner of Virginia and Washington streets as an auxiliary to the power transformer house on Niagara street. The new power house will transform 6000 horse-power of the Niagara current, making 17,000 horse-power from Niagara Falls utilized by the International Railway Company in the operation of their city and suburban lines.

The Witte Iron Works Company, Kansas City, Mo., engine builders, have increased their capital stock from $25,000 to $75,000. It is their intention to gradually increase their capacity.

The city of Anderson, Ind., has contracted with the Westinghouse Electric & Mfg. Company of Pittsburgh for a turbine engine, at a cost of $19,250, for the city electric light plant, and the Electric Light Board was authorized to secure option for another turbine at the same price two years later.

The New Roads Electric Light & Power Company, Limited, will install water works, electric light and ice plants, at New Roads, La., embracing the following equipment: Two 66 inch x 16 foot tubular boilers, 110 horse-power four-valve automatic high speed engine, 75-kw. two-phase alternating current generator, duplicate pumps of 500,000 gallons capacity and 15-ton ice plant, complete. W. H. Fleming of the Delta Power Company, Limited, Hennen Building, New Orleans, is engineer in charge.

At the Titusville Iron Company's plant, Titusville, Pa., the machine shop is running three nights each week. Work is being done on orders booked previous to the recent labor troubles in New York and elsewhere. New orders are coming in a little more slowly than in the spring.

M. R. Rutherford of the Missoula Light & Power Company, Missoula, Mont., informs us that he is in the market for a 125 horse-power Corliss engine and boilers of the same capacity.

Citizens of Williamsburg, Ohio, have voted to sell bonds for the purpose of building a municipal electric lighting plant. It will be built as soon as possible.

Foundries.

The Birmingham Iron Foundry of Derby, Conn., have begun work on a large addition, which will be used as an erecting and roll room and which will also contain some heavy machine tools. The new building will be 75 x 162 feet, the width being in two spans, 50 and 25 feet respectively. The broader span will have a 15-ton Shaw traveling crane, the other a 5-ton Maris traveling crane. The building will be lighted from above by a long skylight in the nearly flat roof, and also by an area of glass 4 feet wide running around the top of the walls.

The S. Obermayer Company, Cincinnati, Chicago and Pittsburgh, are the recipients of orders for full foundry equipments for the following: Georgia Car & Mfg. Company, Savannah, Ga.; American Frog & Switch Company, Kansas City, Mo.; Crestline Mfg. Company, Crestline, Ohio; Schill Bros. Company, Crestline, Ohio, and the new foundry of the Stilwell-Bierce & Smith-Vaile Company, Dayton, Ohio. A new 400-page catalogue illustrative and descriptive of foundry supplies is now on the press, to be ready for distribution about July 15.

The Dean-Waterman Company have purchased the plant of the Covington Foundry Company, Covington, Ky., which they are remodeling. Morris B. Dean, formerly secretary of the Samuel C. Tatum Company of Cincinnati, is president. S. J. Waterman of the company has been for the past three years district sales agent for the American Sheet Steel Company in Cincinnati.

H. G. Shellenberger & Co., Philadelphia, Pa., founders and machinists, advise us that they have not purchased the Weaver-Hirsh foundry at Allentown, as was reported.

The City Foundry Company of Lorain, Ohio, have been organized with $5,000 capital by John J. Schwartz, George J. Roth, John F. Hyre, S. D. Falconer and Andrew Robinson. They will establish a foundry in Lorain.

The Toledo Co-operative Foundry Company of Toledo have elected R. A. White president, Cyrill Freschette secretary and F. E. Reynolds treasurer. The company are seeking a location for their foundry and have several sites in view. The matter will be settled at once.

Boilers, Engines, &c.

Walter S. Bent has been appointed receiver of the Star Mfg. Company, Wabash, Ind., manufacturers of gas engines. Liabilities and assets are placed nominally at $15,000 each. The company were six months old; capital $25,000.

Bridges and Buildings.

The Lafayette Engineering Company of Lafayette, Ind., secured the contract for the new iron bridge over the Wabash River at Terre Haute, Ind. The company's bid was $271,200. It is said to be the largest bridge contract ever let in Indiana.

Fires.

The plant of the American Flint Glass Company, Summitville, Ind., was destroyed by fire June 22, entailing a loss of $75,000.

The Kenyon Paper Mills, Baldwinsville, N. Y., were destroyed by fire June 19. The loss will reach $100,000.

The Arkansas Milling Company's mills and elevator, at Arkansas City, Kan., were burned June 18, causing a loss of $100,000.

The Energy Elevator Company, 411-413 Cherry street, Philadelphia, suffered considerable loss, covered by insurance, occasioned by fire June 21 in an adjoining building. Their damage was largely due to water.

Hardware.

The Lake Shore & Michigan Southern Railway Station, Chicago, has just been completed and will shortly be opened to the public. The hardware for this immense station was furnished by the Orr & Locket Hardware Company, Chicago, being made from special designs furnished by this company to the Reading Hardware Company, Reading, Pa., who were the makers of the hardware. The first and second floors are finished in special sand blast brass, while the other floors are finished in bower barff.

Baltimore Shovel & Mfg. Company, Baltimore, Md., are not at present making shovels and spades, but are giving their attention to the manufacture of galvanized ware, such as pails, tubs, oil cans, &c.

In addition to a largely increased domestic trade on pumps, F. E. Myers & Bro., Ashland, Ohio, have recently secured what is said to be the largest specification for cylinders ever sold in one order and for one shipment. This order is for their well-known glass valve seat cylinders and is intended for South American trade.

For the fiscal year ending May 31 the Syracuse Chilled Plow Company, Syracuse, N. Y., report an exceedingly successful business. The plant was not shut down for inventory and necessary repairs until May 28, much later than usual. This was necessary on account of the large number of orders on hand and the great demand for extras. Both the foreign and domestic sales exceeded those of any previous year in the company's history.

The Universal Nut Lock Company, Stockton, Cal., have been incorporated with a capital stock of $200,000, of which $70,000 has been subscribed. The company will manufacture a patented nut lock. The board of directors comprises E. A. Davidson, W. L. Morrow, E. E. Thrift, J. L. Foley, Alexander Brown, A. W. King and James A. Louttit.

The Simplicity Mfg. Company have been incorporated at Buffalo, N. Y., to manufacture can openers and other patented specialties. Capital stock, $10,000. Directors are B. H. Nye, M. W. Bennett and T. H. Myer of Buffalo.

Wells Brothers Company, Greenfield, Mass., are building an addition of 4000 square feet floor space to their factory, to be used by their grinding department.

The Sawyer Tool Mfg. Company of Fitchburg, Mass., have an order for 100 6-foot straightedge steel rules for one of the large engine builders. These rules are 2 inches wide and are graded to 32ds and 64ths of an inch. It is believed that they are among the longest rules of the kind manufactured.

A stock company with a capital of $65,000 have been formed in Mt. Pleasant Township, Westmoreland County, Pa., for the purpose of building a shovel factory, to be located near Spring Garden. Among the persons interested in the enterprise are O. P. Shupe, J. H. Hitchman, John Husband and Mr. Mullen, all of Mt. Pleasant. The plant is to be completed by October 1.

Miscellaneous.

The Adamite Abrasive Company, North Tonawanda, N. Y., have formed an auxiliary company, who will build a large plant on Schenck street for the purpose of utilizing the surplus raw material product of the Adamite plant. The new plant will manufacture emery wheels principally and will employ 50 men.

W. D. Hofius & Co., Seattle, Wash., manufacturers of logging trucks and flat and box cars, have incorporated as the W. D. Hofius Company. The company carry in stock a large quantity of rails, from 8 to 70 pounds, track materials and railroad equipment, both new and second-hand.

The Cumberland Basin Coal Company, Baltimore, Md., recently incorporated, will mine and ship coal from their property lately acquired in the George's Creek region, Allegheny County. The company expect within the next 60 days to have an output of from 600 to 1000 tons per day. The mines will be self drained and no machinery except electric or tail rope haulage will be required for the present. Thomas F. McGlone is president and Jno. O. Stafford secretary and treasurer.

The Morgan Potter Company, Fishkill-on-Hudson, N. Y., recently incorporated with a capital stock of $50,000, have taken over the plant of Morgan Potter, manufacturer of vehicle brakes and accessories, and will continue the business, which was established in 1893.

The Tallerday Steel Pipe & Tank Company, Waterloo, Iowa, have increased their capital stock from $30,000 to $60,000, for the purpose of increasing their facilities to take care of their growing business.

The Bates Metal Company, Birmingham, Ala., have increased their capital stock from $20.000 to $50,000, to cover their increased business. Two new No. 3 Schwartz oil burning furnaces have lately been installed.

The plant of the Niles Fire Brick Company, at Niles, Ohio, has been enlarged sufficiently to give it an annual capacity of 7,000,000 high grade fire brick, and this company have now one of the most complete high grade fire brick yards in the country. These works were established by the late J. R. Thomas in 1872, and are now being managed for his estate by his son, T. E. Thomas.

The Acme Motor Car Company of Reading, Pa., will apply for a charter July 6. The company intend to manufacture automobiles and propellers. The incorporators are James C. Reber, George D. Horst, Jacob D. Nolde and John D. Horst.

The W. J. Barr Mfg. Company of Cleveland, manufacturers of telephone material, have established a factory at 24 to 36 South Water street, where they have four times the floor space of their old plant. They will add some new machinery to increase their facilities.

The American Fog Signal Company, a New Jersey corporation, with a capital of $300,000, have bought control of the Sculley-McClure Company of Versailles, Pa. By this purchase the American Fog Signal Company practically secure control of the manufacture of the railroad torpedoes and fuses, or signal torches.

The Long Arm System Company of Cleveland, manufacturers of the Long Arm electrically operated hatchway for war vessels, have received orders from the Government for hatchways for the battle ship "Louisiana" and for the cruisers "Maryland" and "West Virginia," now building by the Newport News Shipbuilding & Dry Dock Company.

A 50 horse-power automatic cut off engine is required by the St. Paul Roofing, Cornice & Ornament Company, St. Paul, Minn., who have leased the buildings formerly occupied by the M. A. Gedney Pickling Company. The newly acquired buildings contain about 16,000 square feet of floor space and will enable the company to about double their present capacity. Considerable part of the cutting machinery will be moved into the new quarters, and machinery for a new line of conductor pipe will be installed. The business management is in the hands of A. K. Pruden, president, and C. D. Pruden, vice-president, is in charge of the mechanical department.

The Loller Mfg. Company of Columbus, Ohio, have incorporated with $350,000 capital stock, of which $100,000 was paid in. Incorporators: D. Harrison, E. K. Ascher of Columbus, S. W. Loller of McCracken, Pa., and J. H. Cassiday of Charleston, Ohio. They have secured a site on High street, between Buttles avenue and University street, and will erect a plant for the manufacture of plumbing goods and brass, iron and nickel fixtures. Contracts are to be let at once.

The Lorain & Elyria Ice & Coal Company of Lorain, Ohio, have decided to erect an $80,000 ice producing plant. The building will be 133 x 140 feet and 45 feet high, and will have a capacity of 50 tons per day. The company were recently incorporated with $100,000 capital stock, with William Sehers, president; A. E. Braum, secretary, and H. F. Waring, general manager.

The Union Spring & Mfg. Company, Frick Building, Pittsburgh, with works at New Kensington, have decided on an extension to their works for the manufacture of elliptical springs. The company will install equipment to have a daily output of from 8 to 12 tons of elliptical springs. The works were established last year in the plant formerly operated by the Hussey-Truxall Steel Company at New Kensington.

It is stated that the New Jersey Wire Cloth Company, Trenton, N. J., who are affiliated with the John A. Roebling's Sons Company, are to erect two buildings, 75 x 300 feet each, and equip them for the manufacture of wire cloth.

William B. Scaife & Sons Company of Pittsburgh, Pa., sole manufacturers of the We-Fu-Go and Scaife water softening and purifying systems, have found it necessary to enlarge their plant at Oakmont, Pa., to accommodate their increased business, and have just completed the erection of an additional shop, 60 feet wide by 100 feet long, equipped with the latest improved machinery. They have at the present time systems aggregating 95,000 horse-power under construction for steam boiler plants, in addition to plants for softening water to be used in manufacturing processes, such as dyeing and bleaching in woolen and cotton mills, and for washing in laundries.

L. J. Polk & Son, Millersburg, Pa., manufacturers of taps and dies, have just erected a new building, 20 x 24 feet, of two stories, for office and stockrooms.

The Crosby Company, Buffalo, N. Y., have moved into their new plant on Pratt street, which has double the capacity of their old factory. In the new plant, in addition to their usual product of stamped, annealed and case hardened metals, they will manufacture case hardening and annealing furnaces, having put in equipment for that purpose. The plant is equipped for electrical operation and will be operated by Niagara Falls power. Auxiliary steam power will also be maintained.

The Middletown Car Company of Middletown, Pa., are building a number of refrigerator cars for the Central Railroad of New Jersey. A shipment of 12 cars was made last week.

Application will be made July 6 in Harrisburg, Pa., by William Hoopes, Thomas Hoopes and Edward S. Darlington, all of West Chester, Pa., for a charter for the firm of Hoopes Bros. & Darlington, Incorporated, for the manufacture of vehicles and parts thereof, at West Chester.

The Michigan Novelty Works, who some weeks since removed from Vicksburg to Kalamazoo, Mich., are now occupying the entire first floor of the building formerly occupied by the Kalamazoo Cycle Works, together with a portion of a large building in the rear. They expect to also utilize the second floor of their present quarters within a few weeks as a result of their rapidly increasing business.

The Ironton Disk Plow Company have incorporated at Ironton, Ohio, with a capital stock of $100,000, and will manufacture disk plows under the Fowler and Weeks patents. The company intend erecting a factory within the coming year, but until such time will assemble plows from parts made elsewhere, placing their product before the trade next fall. The officers are: E. J. Bird, Jr., president; W. E. Reynolds, vice-president, and L. G. Brown, secretary and treasurer. Among others interested in the company are J. L. Anderson, C. M. Humes, F. P. Horschel and J. M. Brammer.

The Standard Steel Car Company of Pittsburgh, with works at Butler, Pa., will build an addition of 400 feet to their main building. The work will be done by the McClintic-Marshall Construction Company of Pittsburgh, who erected all the buildings at this plant. The Standard Steel Car Company are full of orders and find it necessary to enlarge their capacity.

The Pennsylvania Portland Cement Company have been

organized with a capital of $1,250,000, and will build a large cement works east of New Castle, Pa. George Greer of the American Tin Plate Company, at New Castle, is president, and connected with the company are Edwin Ohl of the Cherry Valley Iron Company, at Pittsburgh, and Charles Greer of the American Tin Plate Company.

The Elliott Fisher Company of Cleveland, Ohio, recently incorporated with a capital stock of $10,000,000, are a consolidation of the Fisher Book Typewriter Company of Cleveland and the Elliott & Hatch Typewriter Company of New York.

The National Drain Tile Company, Summitville, Ind., whose factory is said to be the largest in the United States, have closed one contract for 80 miles of drain tile. The company have let a contract for 6 miles of steam pipe for their dryrooms.

The Waltham Emery Wheel Company of Waltham, Mass., have bought about 41,000 square feet of land at Worcester, Mass., and will build a plant upon the new site this season. The building will be 45 x 176 feet, a section 72 feet long to be two stories high, the remainder one story. The company have contemplated moving to Worcester for some time, and several sites were considered before the purchase of the present land, which is at East Worcester, and was formerly occupied in part by the plant of the Speirs Drop Forging Company. The Waltham shop will be abandoned as soon as the new building is ready for occupancy.

The business of Clark, Bunnett & Co., 162-164 West Twenty-seventh street, New York, manufacturers of Clark's steel rolling shutters, has been incorporated as the Rolling Steel Shutter Works. The business has been established for 30 years. I. D Thomas is manager.

The Gainesville Cotton Mills, Gainesville, Ga., whose plant was recently wrecked by a cyclone, have let the contract for rebuilding the mills and for the required machinery. Only textile machinery was destroyed, and this will be replaced by the Draper Company of Hopedale and the Saco-Pettee Machine Shops of Newton Upper Falls, Mass.

The old iron ore mines at Margaretta Furnace, Hellam, York County, Pa., may be reopened by York capitalists, for whom Col. H. C. Demming of Harrisburg, Pa., is making tests of the ore.

The Henry A. Frye Steel Hardener Company, 15 West Twenty-seventh street, New York, recently incorporated, will establish a plant for the manufacture of a steel hardening compound and for doing a general line of steel hardening, such as tools, dies, &c. Henry A. Frye is president.

The Lancaster Concrete Block & Paving Company of Lancaster, Ohio, will erect a plant at West Lancaster for the production of concrete building blocks. The building will be 135 x 136 feet, and it is the intention to have it in operation by August 1.

The National Carbon Company of Cleveland will erect two new buildings as additions to their plant on West Madison avenue. Plans are being prepared by the Osborn Engineering Company of Cleveland. One building will be 97 x 105 feet and the other 48 x 71 feet. They will be of steel and fire proof construction.

The White Sewing Machine Company of Cleveland are equipping a very complete repair shop in connection with their new retail store on Rockwell street, where they propose to take care of all their automobile repair work. They are now shipping on an average 20 steam touring cars each week, and a number of these are going abroad.

The Central Iron & Coal Company, an identified interest of the Central Foundry Company of New York, will blow in their new furnace at Tuscaloosa, Ala., about July 1. It was expected that this stack would be ready for operation some months ago; in fact, May 1 was the date set for the first blast, but the inability of the manufacturers to ship the machinery at the specified time has deferred completion for two or three months. The furnace is 18 x 85 feet and will have an annual capacity of about 60,000 tons of foundry iron. The company contemplate the erection of a second stack of about the same size as the one just completed. There is little doubt that another will be built. However, nothing definite will be decided until the first furnace is working satisfactorily.

The American Car & Foundry Company, Jeffersonville, Ind., have decided to let their employees vote on the question of working every Saturday afternoon until 4.30 o'clock and receiving their wages in cash or knocking off at noon and receiving their wages in checks. In answer to a petition that the shops close at noon, General Manager Ingram pointed out that two hours of the morning would thus be lost. The vote will settle a division of opinion among the employees.

OBITUARY.

CAPT. JOHN M. BRINKER, one of Buffalo's most progressive and honored business men, died in that city on the 9th inst. of paralysis. For many years Captain Brinker was an extensive operator of coal mines in Pennsylvania, building up a large coal business in connection with his mining enterprises. A few years ago he built the "Gorge" Railway, a wonderful bit of railroad engineering skill, through the gorge below Niagara Falls. The cost of this short length of electric railway was about $1,000,000. It was he who conceived the idea of the Pan-American Exposition held at Buffalo in 1901, and it was largely through his instrumentality that the exposition project was so successfully managed. Captain Brinker was born in Brinkerton, Pa., in 1835 and his earlier business life was spent in Pennsylvania. At the outbreak of the Civil War he assisted in organizing the Seventy-eighth Pennsylvania Volunteers and commanded one of the companies of that regiment. He moved to Buffalo in 1883, establishing offices for his various enterprices in that city.

DAVID H. MASON, eminent among the advocates of tariff protection, died of pneumonia at his home in Chicago on June 17, aged 74 years. He was born in Philadelphia, graduated at Yale and engaged in daily newspaper work, in which he spent the greater part of his life. In 1868 he removed to Chicago, and for some time was editor of the *Daily Herald*, a paper which had been established in part for the purpose of advocating the protective policy. Subsequently he served as editorial writer on other Chicago papers and for a time edited the *Industrial World*, a trade paper which has since passed out of existence. Mr. Mason was a prolific writer on the tariff question, which he had practically made his life work. Few men have displayed greater ability in the analysis of statistics, and as a logician he was a master.

DAVID HOUSTON of the metal brokerage firm of D. Houston & Co., New York, died June 17 from a stroke of paralysis at his home in East Orange, N. J., aged 81 years. Mr. Houston was the oldest one of the original members of the New York Metal Exchange, and was for a number of years a member of its Board of Managers. He was born in Scotland and had been in the metal business in New York for more than 40 years.

NATHAN C. MCDOWELL, a former well-known resident of Pittsburgh, Pa., died last week of a complication of diseases at Atlantic City, where he had made his home since 1895 on account of failing health. The deceased was in his sixty-sixth year. Mr. McDowell was born at Blairsville, Pa., on August 18, 1837, and went to Pittsburgh when a young man. At one time he was the superintendent of the Singer, Nimick & Company mills on the South Side. Later he was the civil engineer of the city of Allegheny. In more recent years, before leaving Pittsburgh, he was associated with Lindsay & McCutcheon, the Keystone Rolling Mills and the Pittsburgh Tube Company.

At the annual meeting of the Allis-Chalmers Company in Jersey City June 18 the following directors were elected: Charles Allis, James H. Eckels, Philetus W. Gates, Max Pam and James Stillman. Later the directors elected these officers: President, Charles Allis; vice-president and treasurer, William J. Chalmers; second vice-president, Henry W. Hoyt; third vice-president, Philetus W. Gates; fourth vice-president and secretary, Joseph H. Seaman; assistant secretary, Joseph W. Watkins.

The railroad companies have under consideration a revision of the rates on import traffic through the South Atlantic coast ports, which are stated to be very low. It is hoped to advance them by fall. The argument being used to induce the railroads to adjust these rates is that cheap import railroad tariffs destroy the effects of the Government tariff on foreign articles.

The second blast furnace of the Sheffield Coal & Iron Company at Sheffield, Ala., is getting ready to blow in. This is the company of which W. Edenborn is president.

The Iron and Metal Trades.

The past week has not brought very material changes in the Iron markets. The great majority of buyers persist in an attitude of reserve, and there is a growing disposition to make concessions to them. Much is made of the opening of the books of the Steel Rail manufacturers for 1904 orders at $28. It appears that the Western roads have placed about 200,000 tons, with considerable additional business pending. The details are given in our Chicago market report. The Pennsylvania Railroad is credited with having placed 202,000 tons with the mills along its line, but, generally speaking, the Eastern lines have not yet ordered. One point to be taken into consideration in connection with the Rail situation for 1904 is that the Lackawanna Company will be in full operation, with a tonnage which will remove any danger of scarcity. The Harriman roads have placed 10,000 tons with foreign makers, but have not yet closed for the 90,000 tons to be ordered from domestic mills.

From all quarters come the reports that in Foundry Pig Iron a volume of business is being done in moderate lots, for prompt delivery, which contrasts very favorably with the rate of purchases made during the past few months. This, however, is merely proof of the fact that melters are down to the bone in their maneuvering for position for the third and fourth quarters. All the leading buyers are watching the market closely, and inquiries are numerous and important, but the real buying movement has not yet set in. In the meantime, prices are still weakening. In the Central West, Northern makers have gone even below the equivalent of actual Birmingham prices.

It is interesting to note that a good deal of tonnage of foreign Foundry Iron which was due on former contracts has been transferred to domestic producers, the importers selling their foreign Iron abroad and covering on this side. This practically puts an end to this extraordinary and abnormal movement, except that there is considerable temptation still to buy foreign Foundry Iron for drawback on export of manufactures. Lately the agricultural implement makers have been closely studying the possibilities in this direction, not only in Steel but also in Pig Iron.

The Cast Iron Pipe makers continue to do a heavy business. In addition to the Brooklyn contract for 5500 tons, an order for 10,000 tons for the same city's requirements is now being placed.

The Steel market has been quiet, although some round lots have been placed. There is some inquiry, but lower prices are being made. Foreign Steel is being offered at $27.50 to $28, but little business is being done.

The newspapers have been full of reports that the prices for Steel products for 1904 have been fixed. There is nothing in these reports, since in the majority of the lines, excepting Plate and Structural Material, the outside mills are acting entirely independent of the leading producer, and no one talks of 1904 requirements.

Bar Iron is still weak, both East and West, while Steel Bars are being specified for more liberally. Our Chicago correspondent notes the selling of a lot of 5000 tons of Hoops to cover season requirements. In a number of the lighter lines independent manufacturers are setting the pace by making some concessions.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

At date, one week, one month and one year previous.

	June24, 1903.	June17, 1903.	May27, 1903.	June25, 1902.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	*$18.75*	$18.75	$19.50	$22.00
Foundry Pig No. 2, Southern, Cincinnati	*17.25*	17.75	18.25	21.25
Foundry Pig No. 2, Local, Chicago	*19.00*	19.50	20.00	21.50
Bessemer Pig, Pittsburgh	*19.35*	19.85	19.85	21.50
Gray Forge, Pittsburgh	*18.50*	18.75	19.75	20.50
Lake Superior Charcoal, Chicago	24.00	24.00	24.00	24.00
BILLETS, RAILS, &c.:				
Steel Billets, Pittsburgh	*28.50*	29.00	29.50	32.50
Steel Billets, Philadelphia	30.00	30.00	....	29.50
Steel Billets, Chicago	*29.50*	30.00	32.50	....
Wire Rods, Pittsburgh	*36.00*	36.50	37.00	37.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	17.00	17.00	17.00	18.50
O. Steel Rails, Philadelphia	21.00	21.00	21.00	21.00
O. Iron Rails, Chicago	*20.00*	20.00	23.00	24.00
O. Iron Rails, Philadelphia	*23.00*	23.00	24.50	24.50
O. Car Wheels, Chicago	*21.50*	21.50	22.00	21.00
O. Car Wheels, Philadelphia	*21.50*	21.50	22.50	20.00
Heavy Steel Scrap, Pittsburgh	*20.00*	....	21.00	....
Heavy Steel Scrap, Chicago	16.50	16.50	16.50	20.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	*1.75*	1.75	1.85	1.95
Common Iron Bars, Chicago	*1.70*	1.70	1.75	1.80
Common Iron Bars, Pittsburgh	*1.75*	1.75	1.80	1.80
Steel Bars, Tidewater	1.75	1.75	1.75	1.90
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.60
Tank Plates, Tidewater	1.78	1.78	1.80	2.00
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.75
Beams, Tidewater	1.73½	1.73½	1.73½	2.10
Beams, Pittsburgh	1.60	1.60	1.60	1.60
Angles, Tidewater	1.73½	1.73½	1.73½	2.00
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Iron, Pittsburgh	*1.90*	1.90	2.00	2.15
Skelp, Sheared Iron, Pittsburgh	*2.00*	2.00	2.10	2.25
Sheets, No. 27, Pittsburgh	2.65	2.65	2.65	2.90
Barb Wire, f.o.b. Pittsburgh	2.60	2.60	2.60	2.90
Wire Nails, f.o.b. Pittsburgh	2.00	2.00	2.00	2.05
Cut Nails, f.o.b. Pittsburgh	2.15	2.15	2.15	2.05
METALS:				
Copper, New York	*14.50*	14.50	14.75	12.00
Spelter, St. Louis	**5.55**	5.55	5.50	4.70
Lead, New York	*4.12½*	4.12½	4.37½	4.10
Lead, St. Louis	*3.95*	3.90	4.15	3.97½
Tin, New York	*28.12½*	28.60	28.45	28.25
Antimony, Hallett, New York	*6.75*	7.00	7.00	8.37½
Nickel, New York	40.00	40.00	40.00	50.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.99	3.99	3.99	4.19

Chicago.

FISHER BUILDING, June 24, 1903.—(*By Telegraph.*)

Interest has centered in the placing of Rail contracts for 1904 delivery by railroads both East and West. The first agreement was signed at noon on Friday, the 19th inst., and in three days contracts for 125,000 tons were closed, with 75,000 tons additional awaiting signatures and 90,000 tons for Pacific Coast delivery under consideration. The tonnage taken by Western mills thus far aggregates about 200,000 tons and Eastern mills are credited with booking the same quantity. About 125,000 tons additional are expected to be closed for Western roads within the next two weeks. Details will be found under "Rails." Some little improvement has been noted in the volume of business in Pig Iron, both for prompt shipment and delivery during the third quarter, and some large consumers have signified their intention to close for the last half of the year for a considerable quantity within 48 hours. For the ordinary run of business prices have been maintained, but for lots of 1000 tons and over concessions of 50c. per ton have been granted and a further yielding of 50c. per ton is expected on the large contracts pending. Bar Iron has developed further weakness, and while the bulk of the business has been at 1.70c. base, Chicago, this price would be shaded for a fair tonnage of desirable sizes. There has been some little increase in business at the expense of prices. Aside from Rails, the finished products of Steel have continued very quiet. Further increase has been noted in the receipt of specifications for Soft Steel Bars, and a considerable tonnage of Hoops has been placed by coopers for next season's requirements. Car builders have placed a stock order for Structural Material, but, aside from this,

business has been very light. Plates, Sheets, Merchant Steel and Cast Pipe have not changed essentially, with new business rather under the average than otherwise; but implement manufacturers and Steel companies are in the market for Tool Steel for the season's requirements. Billets have continued to show a downward tendency in sympathy with Eastern points, but prices in this market are nominal. Merchant Pipe has been less active, but Boiler Tubes have sold well. Old Material, while weak, has shown a little tendency toward reaction. Coke for spot has been heavy, but for contracts covering the last half of the year a little firmer tone has developed and symptoms of car shortage at the ovens are reported, which will doubtless have an important bearing on the market within the near future.

Pig Iron.—The market has given indications of awakening from its lethargic condition, several lots of 1000 tons each having been closed for the third quarter of the year, and large buyers have signified their intention of closing for a considerable tonnage for the last quarter. Bessemer sold at $19, Detroit, for delivery during the third quarter, and between 300 and 400 tons of No. 3 Foundry, Southern, on the basis of $14, Birmingham, for quick shipment. As a rule, however, it is difficult to purchase Bessemer under $19.50, Chicago. Stove manufacturers, Malleable and general merchants, founders, carriage manufacturers, Pipe works and car builders are among the consumers purchasing in small quantities, and one stove founder is in the market for about 900 tons. An inspection of the orders taken recently by the Southern combination shows a larger percentage than usual of Soft Iron sold and of other Foundry Iron, mainly of the higher grades. A further considerable weakening is reported in the market for Ohio Silvery. Northern Iron has sympathized with the Southern product and has shown a downward tendency, but the market is in a tentative state. The following are the prices current for the third and fourth quarters of the year, the outside prices for quick shipment:

Lake Superior Charcoal	$24.00 to $25.00
Local Coke Foundry, No. 1	.... to 20.50
Local Coke Foundry, No. 2	19.00 to 19.50
Local Coke Foundry, No. 3	18.50 to 19.00
Local Scotch, No. 1	21.00 to 22.00
Ohio Strong Softeners, No. 1	21.00 to 21.50
Ohio Strong Softeners, No. 2	20.50 to 21.00
Southern Silvery, according to Silicon	20.60 to 21.50
Southern Coke, No. 1	19.35 to 19.85
Southern Coke, No. 2	18.85 to 19.35
Southern Coke, No. 3	18.35 to 18.85
Southern Coke, No. 1 Soft	19.35 to 19.85
Southern Coke, No. 2 Soft	18.85 to 19.35
Foundry Forge	18.35 to 18.85
Southern Gray Forge	17.85 to 18.35
Southern Mottled	18.10 to 18.35
Southern Charcoal Softeners, according to Silicon	23.85 to 24.85
Alabama and Georgia Car Wheel	27.85 to 28.85
Malleable Bessemer	19.00 to 19.50
Standard Bessemer	19.50 to 20.00
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon	23.30 to 24.30

Bars.—There has been a further gratifying increase in the number of specifications for Soft Steel Bars received on old commitments, and there has been some increase in new business, mainly in small amounts, ranging from 250 to 500 tons, and one lot of 1000 tons for next season's requirements, but the principal feature of the market has been the increased demand for Hoops, among the sales being one lot of 5000 tons for the season's requirements placed by coopers. Brewers are said to be in the market for further additional tonnage. Bar Iron has developed further weakness, and the increased volume of business has been transacted at the lower prices current, among the sales being one lot of 1000 tons by car builders on the basis of 1.72½c., Chicago, and other contracts in the neighborhood of 1000 tons on the basis of 1.70c., Chicago. At the close even these prices would be shaded for a considerable tonnage of desirable sizes. Most of the business has been for immediate specification and quick shipment. A further considerable tonnage is anticipated in the near future. The following are the prices current, f.o.b. cars, Chicago, mill shipment: Bar Iron, 1.70c. to 1.75c.; Soft Steel Bars, 1.76½c. to 1.86½c.; Hoops, 2.16½c. to 2.26½c.; Angles, under 3 inches, 1.86½c. to 1.91½c., base. The merchant trade has shown a little more animation, and the market has remained steady at the following range of prices: Bar Iron, 2c. to 2.15c.; Soft Steel Bars, 2c. rates; Angles, under 3 inches, 2.10c. rates, and Hoops, 2.40c., base, from store.

Structural Material.—The market has continued very quiet, generally considered, although some little improvement has been noted, among the more important transactions being the placing of stock orders by car companies, aggregating 1000 or 2000 tons. The market has remained steady at the following prices: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 2c. to 2.25c. Some little improvement has been noted in the demand for shipment from local stocks which has been readily met at previous prices. The following are the prices current: Beams and Channels, 2¼c. to 2½c.; Angles, 2.25c. to 2.50c.; Tees, 2.30c. to 2.55c., at local yards.

Plates.—Dullness has been the principal feature of the week, no large transactions being noted, and even the smaller transactions in the aggregate have been insignificant. The market, however, has remained firm, as previously quoted, f.o.b. cars, Chicago, mill shipment: Tank Steel, ¼-inch and heavier, 1.75c. to 2c.; Flange, 1.85c. to 2.15c.; Marine, 1.95c. to 2.10c. There has been a quiet and steady market for shipment from local stocks without change in prices, which are as follows: Steel, ¼-inch and heavier, 2.15c. to 2.20c.; Tank Steel, 3-16 inch, 2.25c. to 2.30c.; No. 8, 2.30c. to 2.40c.; Flange Steel, 2.40c. to 2.50c., all f.o.b. warehouse, Chicago.

Sheets.—While there has been a fair inquiry, the volume of business for both Black and Galvanized Sheets has been only moderate, and prices have been without essential change. The following are the prices asked for Black Sheets, carload lots, Chicago, mill shipments: No. 10, 2.12½c. to 2.16½c.; No. 12, 2.22½c. to 2.26½c.; No. 14, 2.32½c. to 2.36½c.; No. 16, 2.42½c. to 2.46½c.; Nos. 18 and 20, 2.56½c. to 2.60½c.; Nos. 22 and 24, 2.66½c. to 2.70½c.; No. 26, 2.76½c. to 2.80½c.; No. 27, 2.86½c. to 2.90½c.; No. 28, 2.96½c. to 3.00½c. A little firmer tone has been noted as far as merchants are concerned, the tendency to cut prices 5c., which has been noted for several weeks, having been eliminated by readjustment of prices, which are about 10c. to 15c. over mill prices given above. Galvanized Sheets have been moderately active and steady at 75 and 10 discount, Pittsburgh, and 75 and 5, Chicago, for mill shipment. Independent mills occasionally accept orders at a shade under these quotations, but this is exceptional. There has been a quiet market for small lots for shipments from store, sales being made mainly on the basis of 75 and 2½ to 75 discount.

Cast Pipe.—There has been an absence of large transactions and only a moderate current order trade for small amounts for shipments to water and gas companies, railroads and mining companies, which, in the aggregate, however, is a fair tonnage. Erie, Pa., is to let a contract on the 27th inst., and Sacramento, Cal., early in July. While the market is easier in tone, prices for small lots are maintained at the following quotations, f.o.b. cars, Chicago: 4-inch, $33; 6-inch, $32; 8-inch, $31.50, and larger, $31 for Water, and $1 per ton higher for Gas Pipe.

Billets.—There is a fair inquiry for small Open Hearth Forging and Axle Billets, but little inquiry for Bessemer, and in the absence of trading prices are little better than nominal. Round lots and Rerolling Bessemer Billets would be difficult to sell over $29.50 and Open Hearth at $29.50 to $30, Chicago; but single car lots continue to sell at from $33 to $38, according to analysis, buyer and time of delivery, with some premium obtained for jobbing quantities.

Merchant Pipe.—While there has been some falling off in the number of orders received during the week, it has been without special significance, manufacturers not anticipating an increase in business until after July 1, the merchant trade naturally holding off temporarily. An interesting feature is that manufacturers, especially implement producers, are using Merchant Pipe more liberally than a few years ago. The market has been steady at the following schedule of discounts for carload lots, Chicago, base, random lengths, mill shipment:

	Steel Pipe.		Guaranteed Wrought Iron.	
	Black.	Galvd.	Black.	Galvd.
	Per cent.	Per cent.	Per cent.	Per cent.
⅛ to ¾ inch	66.35	56.35	63.35	53.35
½ inch	68.35	58.35	65.35	55.35
¾ to 6 inches	73.35	63.35	70.35	60.35
7 to 12 inches	67.35	57.35	64.35	54.35

Less than carloads, 12½ per cent. advance.

Boiler Tubes.—The market has been without essential change, although dealers have been placing a less heavy tonnage than for several weeks. This, however, is without significance. The market has remained steady at the following schedule of discounts:

	Steel.	Iron.
1 to 1½ inches	43.35	38.35
1¾ to 2½ inches	55.85	35.85
2¾ to 5 inches	60.85	45.85
6 inches and larger	55.85	35.85

Less than carloads, 12½ per cent. advance.

There has been some little increase in the demand for small amounts for quick shipment from store and the market has remained steady at the following schedule of discounts for shipment from local stocks:

	Steel.	Iron.
1 to 1½ inches	40	35
1¾ to 2½ inches	50	32½
2¾ to 5 inches	57½	42½
6 inches and larger	50	..

Merchant Steel.—While less activity has been noted, the market has not changed essentially and several 100-ton lots, especially of Spring Steel, have been sold during the week. Cold Rolled Shafting and Screw stock have continued to sell quite readily, but Tire Steel has been quiet.

Season's contracts for Tool Steel to a considerable amount are expected to be closed between now and July 1. Prices have remained steady as previously quoted for mill shipment, as follows: Smooth Finished Machinery Steel, 2.01½c. to 2.11½c.; Smooth Finished Tire, 1.96½c. to 2.11½c.; Open Hearth Spring Steel, 2.66½c. to 2.76½c.; Toe Calk, 2.31½c. to 2.46½c.; Sleigh Shoe, 1.86½c. to 1.96½c.; Cutter Shoe, 2.41½c. to 2.61½c. Ordinary grades of Crucible Tool Steel are quoted at 6c. to 8c. for mill shipment; Specials, 12c. upward. Cold Rolled Shafting in carload lots sells at 47 and in less than carload lots at 42 discount from list.

Rail and Track Supplies.—The establishment of $28 as the official price for Standard Rails for 1904 delivery was the signal for the placing of large contracts by both Eastern and Western Railroads. Although no contract had been placed prior to the recent New York meeting, the fact that the requirements of largest railroad interests had been canvassed led to reports that contracts had been placed. The first actual transaction, however, was not closed in the West until Friday last. In the aggregate Western mills have taken contracts for 200,000 tons and Eastern mills have entered orders for an equal tonnage, and about 125,000 tons additional are under negotiations in the West. The railroads seem to have been in active competition for priority of place in ordering, induced by the desire for preferred shipment. Contracts thus far placed for 1904 delivery are as follows: Chicago, Burlington & Quincy, 40,000 tons; Chicago, Milwaukee & St. Paul, 40,000 tons; Chicago & Northwestern, 35,000 tons for the main line and 5000 tons for the Chicago, Minneapolis & Omaha division; Rock Island, 25,000 tons for shipment during the first quarter of 1904 and a tentative order for 25,000 tons additional; Illinois Central, 25,000 tons for 1904, and will probably need 15,000 tons for the balance of 1903; Lake Shore & Michigan Southern, 25,000 tons; Nickel Plate, 5000 tons, or an aggregate of 200,000 tons. Contracts for 125,000 tons were signed in three days, Friday, Saturday and Monday, June 19, 20 and 22. The Pennsylvania Railroad has placed an order for 118,000 tons with the Carnegie Steel Company and 82,000 tons divided between the Cambria and Pennsylvania Steel companies. The Central and Southern Pacific railroads have placed a contract for 10,000 tons foreign Rails, and 90,000 tons of domestic Rails are under negotiations. In addition to these large contracts there have been several thousand tons of Standard Sections, one lot of 1000 and one lot of 2000 tons, placed for delivery during the fourth quarter of 1903. There has also been a fair demand for Light Sections. Official quotations remain strong at $28 for Standard and $27 for second quality, mill shipment. Light Rails have sold at $34 to $39, according to weight. Track Supplies have also been active, among the buyers being the Louisville & Nashville Railroad for 46,000 pairs of Angle Bars for early shipment. The market has continued firm at the following prices for mill shipment, Chicago: Splice or Angle Bars, 2c. to 2.10c.; Spikes, 2.10c. to 2.15c.; Track Bolts, 3½ to 3¾ inches and larger, with Square Nuts, 2.85c. to 2.90c.; with Hexagon Nuts, 3c. to 3.10c. From store, 10c. to 15c. over mill prices are asked and obtained.

Old Material.—While the market has been slow and easy, it has been notable that there has been less pressure to sell, sellers rather anticipating a reaction after the continued heavy drop throughout the entire market. Mills, while not buying heavily, have been more disposed to purchase at the lower level. Prices have been without further change of special significance. The following are the prices current per gross ton, Chicago:

Old Iron Rails	$20.00 to $20.50
Old Steel Rails, mixed lengths	17.00 to 17.50
Old Steel Rails, long lengths	19.50 to 20.00
Heavy Relaying Rails	31.00 to 31.50
Old Car Wheels	21.50 to 22.00
Heavy Melting Steel Scrap	16.50 to 17.00
Mixed Steel	14.50 to 15.00

The following quotations are per net ton:

Iron Fish Plates	$17.00 to $17.50
Iron Car Axles	21.00 to 22.00
Steel Car Axles	20.00 to 21.00
No. 1 Railroad Wrought	15.00 to 16.00
No. 2 Railroad Wrought	14.00 to 14.50
Shafting	17.00 to 18.00
No. 1 Dealers' Forge	13.00 to 14.00
No. 1 Busheling and Wrought Pipe	12.50 to 13.00
Iron Axle Turnings	12.00 to 12.50
Soft Steel Axle Turnings	12.00 to 12.50
Machine Shop Turnings	12.00 to 12.50
Cast Borings	7.00 to 7.50
Mixed Borings, &c	8.00 to 9.00
No. 1 Boilers, cut	.... to 13.00
Heavy Cast Scrap	14.00 to 14.50
Stove Plate and Light Cast Scrap	.... to 10.00
Railroad Malleable	15.00 to 15.50
Agricultural Malleable	.... to 14.00

Metals.—Some little increase has been noted in the demand for Casting Copper, but the market has remained easy in tone. Casting Copper has been sold at 14c. and Lake is held at 14½c., Chicago, in carload lots. Advices from Missouri indicate a less strong market for Spelter, but the local market has been well sustained at 5.60c. in carload lots. Sheet Zinc is scarce and prices are entirely nominal. It being the policy of the American Refining & Smelting Company to make prices on Pig Lead in New York only, quotations in this market are entirely nominal at 4.05c. in 50-ton lots and 4.05½c. in carload lots. Old Metals have been quiet, with Copper easier, Lead Pipe lower and Zinc firmer. Heavy Cut Copper sells at 12c.; Red Brass, 11¼c.; Copper Bottoms, 10⅞c.; Lead Pipe, 3.75c., and Zinc, 4.65c., spot.

Coke.—The local market is still flooded with spot supplies, which are held on track and are difficult to dispose of even at concessions, consumers being well stocked. There is a better demand for contracts, however, and several important transactions are under negotiations. Reports from the ovens indicate that there is a return of the old condition of a shortage of cars to move the accumulated stocks. Furnace Coke is selling at $2.75 to $3, and Standard Foundry Coke at $3.50 to $4, at the ovens. Sales of small lots of Furnace Coke have been made at $4.65 to $5.15 and Foundry Coke at $5.60 to $6, in single car lots, spot track, Chicago.

Philadelphia.

FORREST BUILDING, June 16, 1903.

Business in Iron and Steel is about as dull as it has been at any time during the year, but there is a feeling that a renewal of activity is not far distant. Consumption has been going steadily on, while buying during the past six or eight weeks has been practically nothing. This, of course, cannot continue indefinitely, and while prices may even now not be specially attractive, they are certainly more so than they were a month or six weeks ago, so that there is reason to believe that buyers and sellers will soon reach an agreement. Sellers have been willing to do their share for some time past, and as buyers are beginning to need Iron, there is little doubt that in course of two or three weeks there will be something doing. Prices are not absolutely certain, but it looks like $18.50 to $19 for No. 2 X Foundry for Philadelphia delivery, or on large lots for shipments extending all through the year there is a possibility that better may be done on first-class business. The disturbing features which have been more or less inimical to healthy conditions are expected to be out of the way within a brief period, failing which capital will permit labor to follow its bent until it has devoured its own substance. With the basis of values soon to be established and a general resumption of work, there should be an active business during the last half of the year, particularly if there is no further setback to the crops. The feeling in regard to these matters is hopeful, and, as already stated, the prospect for a better demand for Iron is regarded with a considerable degree of confidence. Meanwhile, of course, it may be postponed until well into the coming month, or even to a still later date, but that we are on the eve of a better demand is the almost unanimous opinion of those in the trade.

Pig Iron.—There has been no improvement in the demand thus far, although prices have been steadily weakening, and so far without the slightest indication of reaction. As already remarked, however, it is pretty clear that the yielding process has about reached its limit, and with buying in such volume as may be reasonably expected a firmer tone would be the natural outcome. But these are times when it is difficult to say what may happen; all that can be safely said is in regard to present actualities. There appears to be a little No. 2 X Foundry Iron selling at $19.50, delivered, more at $19, and some at $18.75 price, according to quantity, quality and delivery. No. 2 Plain has been done at $18.25, but $18.50 is nearer to the market. Some ordinary Gray Forge was placed at $17.50, but there is a good deal of irregularity in this grade, some asking as much as $19, but anywhere from $18 to $18.50 would be asked for a good mill Iron. Buying has been on an unusually small scale recently, and as the holidays are so near and labor settlements (or unsettlements) seem like being closed up, it is quite possible that new deals may be postponed until toward the middle of next month, as there is no reason for special haste, while there is still a possibility that there may be "luck in leisure." Be that as it may, today's prices for city or nearby deliveries would be about as follows:

No. 1 X Foundry	$20.00 to $20.50
No. 2 X Foundry	18.75 to 19.50
No. 2 Plain	18.00 to 18.50
Gray Forge	17.75 to 18.25
Basic	18.50 to 19.00

Cargo lots c.i.f.:

Low Phosphorus, 0.035	$20.85 to $21.00
Middlesbrough, No. 3	16.75 to 17.00

Steel.—So far as actual business is concerned there is very little doing, but there is quite a good deal of inquiry, and it is likely that several lots will be closed at an early date. Special Steel is selling all the time, but buyers of ordinary grades have been waiting for lower prices. Sellers quote $30 f.o.b. at local mills; buyers expect deliveries to be made in their yards at that or slightly lower figures. The new mills at Conshohocken (Alan Wood Iron & Steel Company) are now in operation and are rolling Steel for the finishing mills.

Plates.—There is a good average demand for small and medium sized lots, but large orders are not around to any great extent at the present time. Deliveries are large, however, and prices are firm at the prices agreed upon by the Plate Association, viz.: Carload lots, ¼-inch and thicker, 1.75c. to 1.80c.; Universals, 1.80c.; Flange, 1.90c.; Marine, 2c. to 2.05c.; Fire Box, 2.10c. to 2.20c; smaller lots 1-10 to 2-10 more money.

Structural Material.—The delay in building operations and the approach of the national holiday prevent any special movement at the present time, hence there are very few sales, and mills are in a position to make prompt shipments. Prices are steady and unchanged, viz.: Beams, Angles or Channels, ordinary sizes, 1.73½c. to 1.80c. for carload lots, with the usual addition for smaller quantities.

Bars.—There is no change in the Bar situation. The demand is fair, but so many are after the business that it is difficult to keep the mills going, hence there is more or less irregularity in prices. The usual midsummer suspension of work will probably be more protracted than during the past year or two, but it is hoped that by the time they are ready to start up there will be sufficient orders booked to give full employment during the fall months. Meanwhile prices are about 1.75c. f.o.b. mills for Refined Iron, and 1.65c. to 1.75c. for Steel.

Sheets.—There is more demand, but prices are not all what they should be considering the cost of the raw material. Mills are quite busy, however, and to that extent the situation is satisfactory.

Old Material.—There is hardly any demand at present, as the mills are not disposed to stock up until next month. Prices are more or less irregular, but in the absence of actual sales the market would probably be about as follows:

Old Steel Rails	$21.00 to $21.25
Heavy Steel Scrap	20.50 to 21.00
Low Phosphorus Scrap	26.00 to 28.00
Old Steel Axles	22.00 to 23.00
Old Iron Rails	23.00 to 24.00
Old Iron Axles	26.00 to 27.00
Old Car Wheels	21.50 to 22.50
Choice Scrap, R. R. No. 1 Wrought	20.50 to 21.00
Country Scrap	19.00 to 19.50
Machinery Scrap	18.00 to 19.00
No. 2 Light Scrap	18.00 to 18.50
No. 2 Light (Ordinary)	13.00 to 13.50
Wrought Turnings	15.00 to 15.50
Wrought Turnings, Choice Heavy	16.00 to 16.50
Cast Borings	10.00 to 10.50
Stove Plate	14.00 to 15.00

Cincinnati.

FIFTH AND MAIN STS., June 24, 1903.—(*By Telegraph.*)

The Pig Iron market appears upon the surface to be listless and inclined to weakness. Lower figures are being offered, and are as yet unproductive of trade. The hand to mouth tactics of the buying contingent continue, and inquiries for anything like round lots of Foundry or Mill Irons are not in the market. Northern Irons have been cut very sharply, and are now on a lower basis than Southern grades, even on the basis of $14, Birmingham, for No. 2 Foundry. A sale of near 1000 tons of Gray Forge and Mottled mixed is reported on the basis of $12, Birmingham, and this is about the only sale of these goods heard off. The outlook is uncertain, and a pessimistic tone seems to pervade the ranks of selling agents. The Southern Association basis of $15 for No. 2 still stands, and the members of the compact are generally credited with standing to their schedules. Freight rates from the Hanging Rock district, $1.15, and from Birmingham to Ohio River points, $3.25. We quote, f.o.b. Cincinnati, for delivery throughout the year, as follows:

Southern Coke, No 1	$17.75 to $18.75
Southern Coke, No. 2	17.25 to 18.25
Southern Coke, No. 3	16.75 to 17.75
Southern Coke, No. 4	16.25 to 17.25
Southern Coke, No. 1 Soft	17.75 to 18.75
Southern Coke, No. 2 Soft	17.25 to 18.25
Southern Coke, Gray Forge	15.25 to 17.00
Southern Coke, Mottled	15.25 to 17.00
Ohio Silvery, No. 1	24.65 to 25.65
Lake Superior Coke, No. 1	.... to 18.65
Lake Superior Coke, No. 2	.... to 18.15
Lake Superior Coke, No. 3	.... to 17.65

Car Wheel and Malleable Irons.

Standard Southern Car Wheel	$26.75 to $27.00
Lake Superior Car Wheel and Malleable	24.75 to 25.25

Plates and Bars.—We quote, f.o.b. Cincinnati: Iron Bars, in carload lots with half extras, 1.75c.; same, in small lots with full extras, 2.20c.; Steel Bars, in carload lots with half extras, 1.75c.; same, in small lots with full extras, 2c.; Base Angles, 1.70c.; Plates, ¼-inch, 1.70c.; Beams and Channels, 1.70c.

Old Material.—We quote dealers' buying prices as follows, f.o.b. Cincinnati: No. 1 Wrought Railroad Scrap, $15.50 per net ton; Iron Axles, $23.50 per net ton; Cast Scrap, $14, gross; Iron Rails, $22, gross; Long Steel Rails, $18, gross; Car Wheels, $21, gross; Low Phosphorus Steel, $22, gross; Heavy Melting Steel, $17.50, gross.

St. Louis.

CHEMICAL BUILDING, June 24, 1903.—(*By Telegraph.*)

Pig Iron.—Review of the Pig Iron conditions the past week does not seem to reveal any changes in the general situation. Buyers and sellers are still at loggerheads on the prime question, and such buying as does show is that of quick shipment orders. Representatives of the Associated Southern Furnaces continue to quote $15, Birmingham, for No. 2 Foundry; but some few lots have been sold by other parties under this rate, not, as far as we can ascertain, in very large quantities. We quote, f.o.b. St. Louis, as follows:

Southern, No. 1 Foundry	$19.25 to $19.50
Southern, No. 2 Foundry	18.75 to 19.00
Southern, No. 3 Foundry	18.25 to 18.50
Southern, No. 4 Foundry	17.25 to 18.00
No. 1 Soft	19.25 to 19.50
No. 2 Soft	18.75 to 19.00
Gray Forge	17.00 to 17.25
Southern Car Wheel	27.25 to 27.50
Malleable Bessemer	20.00 to 20.50
Ohio Silvery, 8 per cent. Silicon	27.00 to 27.25
Ohio Strong Softeners, No. 1	23.25 to 23.50
Ohio Strong Softeners, No. 2	23.50 to 23.75

Bars.—Conditions with the jobbers are about on the same basis, and while trade is not exceptionally heavy, it is of a satisfactory order. We quote from the mills: Iron Bars at 1.75c. to 1.85c.; Steel Bars at 1.80c. to 1.90c., half extras. Jobbers' quotation continues as before, 2.15c. in round lots, with an advance of from 5c. to 10c. where small quantities are wanted, for both Iron and Steel.

Rails and Track Supplies.—This department of the market is said to be holding up in a satisfactory manner, and while perhaps a little lighter run of inquiry and orders were recorded the past week, the general aggregate of trade has been satisfactory. We quote as follows: Splice Bars, 2.05c. to 2.15c.; Bolts, with Hexagon Nuts, 3.05c. to 3.15c.; Bolts, with Square Nuts, 2.90c. to 3c.; Spikes, 2.15c. to 2.25c.

Angles and Channels.—The jobbing trade report a very fair run of business for Small Angles and Channels. The quotation varies from 2.25c. to 2.40c. for material of this class, according to quantity.

Pig Lead.—Transactions in the Lead market of late have not been of very important consideration and at this time the market is very quiet. The quotation is nominally 3.95c. to 4c. for Missouri brands and 4.02½c. for Desilverized.

Spelter.—The Spelter market is bare of offerings for immediate delivery, with a fair call for futures. Metal for future delivery is quotable at 5.45c. to 5.50c.

Birmingham.

BIRMINGHAM, ALA., June 22, 1903.

That trite old saying, "the least said is the soonest mended," applies with special force to conditions existing at present in the Iron market. All the associated interests are unanimous in reporting prices on the basis of last meeting, and what sales they have made have been on that basis. There have been no concessions granted. But the buying has been very limited in volume and confined to the piecing out process. Purchases cover only nearby deliveries and there is very little interest being manifested in the deferred deliveries. It is a waiting market still, with two antagonistic elements among the sellers, one element being the Associated Furnaces, selling at an agreed price, and the other element being the independent furnaces, with a disposition to keep furnace yards cleaned up. To do this prices have been cut to figures necessary to move the Iron. But after diligent investigation the conclusion is that the sales at material reductions have been limited and much smaller than those of the associated furnaces. One report from good sources is to the effect that business in No. 2 Foundry has been worked at $14. But one must not lose sight of the fact that but a moiety of the requirements in sight can be supplied at these cut rates, and when there is any activity at all in buying the associated furnaces will again dominate the market. They are inclose touch with each other and working in harmony. Their view is that concessions by the independent furnaces simply postpone or delay the demand, and when it does come they will have very little stock with which to feed it. There has been a good deal of figuring as to how much decline would be necessary from association prices to force a shut down on some of the furnaces in the district. But conclusions are so at variance with each other that the question is hard to determine. It is safe to say that they will all run as long as they can.

The adoption of labor saving appliances of all kinds and the introduction of machinery tending to greater economy in production cost have in the last two years added materially to output without increasing the fixed charges. So that these economics are to be considered in comparing the cost of Iron as now made and what it was under conditions now obsolete. The infusion of fresh blood into the management of affairs here has resulted in very great improvements involving the expenditure of large amounts of money. The

improved conditions attest the wisdom of the course pursued. We are forging ahead to again attain the place where we can claim minimum cost of production as compared with any producing center.

The annual meeting of the miners is now in progress. After a session lasting all of last week they are now to meet the Coal operators to agree on the scale of wages for another year. It is learned from good sources that the miners will demand an advance of 5 cents in the mining of Coal, an eight-hour day for labor and a pay day twice each month. The last demand is aimed at the commissary, which every interest maintains. The operators, it is understood, will not concede any of the demands, and we are brought face to face with a threatened strike. Just at this time influential interests would not object to it, as it would stimulate the Iron market and give an opportunity to clean house. It is probable that a strike of short duration may ensue, as the same demands made now were made last year and refused. It appears that a majority of the operators are in favor of holding out, and an influential element among the miners are equally determined. Their course of action has been well guarded and the leaders have affairs well in hand.

(By Telegraph.)

The convention of United Mine Workers of Alabama have formulated their demands, which are as outlined in letter to *The Iron Age* forwarded this week. The operators replied with counter propositions, and the differences are now under discussion. They are so widely divergent that a prolonged wrangle is probable before a settlement is arrived at. It would not be surprising if some weeks elapsed before a satisfactory settlement was reached. Both sides are resolved, but there is entire absence of any bitter feeling. The operators would much prefer a cessation of work than concede the miners' demands, and that contingency has been fully considered. There is absolutely nothing definite so far upon which to predicate a safe opinion as to the final settlement; neither side will obtain all that it demands.

Pittsburgh.

PARK BUILDING, June 24, 1903.—(*By Telegraph.*)

Pig Iron.—The market continues extremely quiet, hardly enough metal being sold to fix prices. There is a more active inquiry, but consumers are very slow to take hold until they are absolutely satisfied that the bottom of the market has been reached. Bessemer is held at about $18.50 to $19 for ordinary lots and prompt shipment, but on large lots for delivery over the balance of the year as low as $18, at Valley furnace, has been quoted. There is practically no Forge Iron selling, and Northern brands are quoted at $18.50 to $18.75, Pittsburgh. Northern No. 2 is held at $19.75 to $20, Pittsburgh.

Steel.—There is very little inquiry and only small lots are changing hands. The largest transaction for some time was a sale of 5000 tons of Open Hearth Axle Billets, deliveries being 1000 tons a month, commencing August. Bessemer Billets are held at $28.50 to $29, and Open Hearth $29 to $29.50, makers' mill. There is some inquiry for Sheet Bars, which for prompt delivery are held at about $31, makers' mill. On a large tonnage of Sheet Bars and for extended delivery a lower price would probably be made.

(By Mail.)

Extreme quietness continues to prevail in the Iron trade, and the amount of tonnage being placed in Pig Iron, Steel and in some kinds of Finished Material is relatively small. There seems to be a lack of confidence on the part of buyers, and some comparatively low prices recently quoted on Pig Iron have failed to bring in business. It is not believed the situation will show any material change for a month or more yet, but a better buying movement is confidently expected late in July or early in August. The Iron trade has had a good deal to contend with in the last month or so, principally labor strikes, which have restricted demand to a very considerable extent. Indications now are that a general strike of machinists will take place on July 1 and foundries and machine shops are getting out as much work this month as possible. Bessemer Iron for shipment over last six months of the year is being freely offered at $18.50, at Valley furnace, and in exceptional cases $18 has been named, but very little tonnage is being placed. Billets for prompt shipment are reasonably firm, and Bessemer Steel is held at $28.50 to $29, depending on the size of the order and deliveries wanted. In Finished Iron and Steel there is nothing of interest to note. A fair amount of tonnage is being placed, but not nearly so heavy as some time ago.

Muck Bar.—The market is extremely dull, and Northern grades of Muck Bar are being offered low as $33, Pittsburgh. On a firm offer probably $32.50 could be done.

Steel Rails.—A meeting of the Steel Rail mills was held in New York on Thursday of last week, and the price was fixed at $28 a ton for 1904 delivery, the same price as this year. The Pennsylvania Railroad have placed a contract for about 200,000 tons, divided between the United States Steel Corporation, Cambria Steel Company and Pennsylvania Steel Company. The fixing of the price of Rails at $28 and the fact that considerable tonnage has already been placed for next year delivery are expected to have a good general effect on the market.

Plates.—A fair amount of tonnage in Plates is being placed, but the situation is quieter than for some time. Considerable new tonnage is pending, and will probably be given out within the next week or two. There is no change in prices, which are as follows: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price up to 3c. Plates more than 100 inches wide, 5c. extra per 100 lbs. Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Structural Material.—New building operations have practically been suspended, owing to the labor troubles, which have now reached an acute stage. The strikes of the machinists, boilermakers, pattern makers and kindred trades, which promise to last for some time, are having a very injurious effect on new enterprises, with the result that practically no new work is being given out. Had it not been for these labor troubles there is no doubt whatever but that this year would have been a banner year in the Structural Steel trade. There is no change in prices, which are as follows: Beams and Channels up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.60c.; Steel Bars, 1.60c., half extras at mill; Universal and Sheared Plates, 1.60c. to 1.70c.

Hoops and Bands.—A fair amount of tonnage is being placed and specifications on old contracts are coming in at a fairly satisfactory rate. New prices have been adopted for Cotton Ties, and we now quote as follows: 86½c. per lb. per 10,000 bundle lots or over; 91½c. for carloads; Steel Hoops, 1.90c. on 250-ton lots and 2c. for carloads; Bessemer Bands, 1.60c. for Bessemer Stock and 1.70c. for Open Hearth. Extras as per Steel card.

Ferromanganese.—Very little tonnage is being placed. We quote 80 per cent. Ferro at $50 in large lots delivered.

Sheets.—There is a fairly active inquiry for Black Sheets and the tone of the market is strong. Most of the leading mills are pretty well filled up and quite a number of inquiries are in the market. Some little weakness in Galvanized has developed in the past week or two, and these are being offered low as 75-10 and 2½ per cent. off at maker's mill. We quote Black Sheets as follows: Nos. 22 and 24, Box Annealed, one pass through cold rolls, 2.45c.; No. 26, 2.55c.; No. 27, 2.65c. to 2.75c., and No. 28, 2.75c. to 2.85c. We quote Galvanized Sheets at 75 and 10 to 75, 10 and 2½ off in carload and larger lots.

Iron and Steel Bars.—A few small contracts have been placed in the past week for Steel Bars, but generally speaking, the situation is not satisfactory, and unless tonnage soon shows improvement the mills will be short of work. Orders from the Agricultural Implement trade this year have not come up to expectations and the capacity of the leading mills for turning out Steel Bars is now so large that it takes an extraordinary tonnage to keep them filled up. The market on Iron Bars is easier in tone, some of the mills being evidently short of work and are willing to make slight concessions in prices to secure tonnage. We quote Iron Bars at 1.75c., Pittsburgh, half extras as per National card, but on a desirable contract it is probable that 1.70c. would be done by some mills. We quote Steel Bars at 1.60c., at mill. All specifications for less than 2000 lbs. of a size subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10c. per lb. extra. Quantities less than 1000 lbs., 0.30c. per lb. extra, the total weight of a size to determine the extra regardless of length.

Rods.—Some fair sized inquiries are in the market for Rods, and it is said that one contract for about 2000 tons of Bessemer Rods was recently placed on the basis of $36, Pittsburgh. Open Hearth Rods are held at about $37, maker's mill.

Tin Plate.—The situation in Tin Plate is good, and the leading mills are filled up for several months. We quote 100-lb. Cokes at $3.90 to $4 a box, f.o.b. Pittsburgh. The price of the leading interest remains at $3.80, f.o.b. Pittsburgh.

Merchant Steel.—Some fair sized orders have recently been placed for Spring and Tool Steels, and demand for Shafting is also slightly better. There is no change in prices, and we quote, f.o.b. mill, as follows: Tire Steel, 1.80c. to 1.90c.; Open Hearth Steel, ordinary grades, 1.70c. to 1.80c.; Open Hearth Spring, 2.25c. to 2.35c.; Cant Hook Steel, 2.75c. to 3c.; Plow Slabs, Bessemer, 2.50c.; Plow Slabs, Open Hearth, 2.75c. to 2.85c.; Tool Steel, ordinary grades, 6½c. and upward; Cold Rolled Shafting, 42 per cent. off in less than carloads, and 47 per cent. in carloads, delivered in base territory.

Pipes and Tubes.—The Pipe market continues in very satisfactory shape, tonnage so far this year showing a material increase over last year. On the larger sizes of Pipe, 10-inch and upward, the mills are filled up into October or later, and inquiries are in the market for several large gas lines, which, if put through, will require a heavy tonnage. The fact that the mills are so well filled up makes it somewhat doubtful whether additional tonnage for these gas lines can be gotten out in time to lay the lines before the cold weather starts. Discounts to consumers, in carloads, are as follows:

Merchant Pipe.

	Steel.		Wrought Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inches	75	65	72	62
7 to 12 inches	69	59	66	56

Merchant Boiler Tubes.

	Steel.	Iron.
1 to 1¼ inches	42½	39
1¾ to 2½ inches	55½	38
2¾ to 5 inches	61	48
6 to 13 inches	55½	38

Iron and Steel Skelp.—The market continues quiet, and prices are only fairly strong. We quote Grooved Iron and Steel Skelp at 1.90c. and Sheared at 2c., f.o.b. Pittsburgh. On a firm offer these prices might be shaded.

Coke.—The situation in the Coke trade is decidedly unsatisfactory, the market still being burdened with a surplus of Coke, and some low prices are being made. Some contracts for Furnace Coke have been made at $2.75 at oven for shipment over last six months, but there are well defined reports that lower prices are being made by some of the operators to induce consumers to make contracts. Foundry Coke for shipment over last six months is being offered as low as $3.25 at oven for genuine Connellsville, but outside Cokes are being offered at lower figures. Output of the Upper and Lower Connellsville regions is running a little over 300,000 tons a week.

Cleveland.

CLEVELAND, OHIO, June 16, 1903.

Iron Ore.—The situation is somewhat complicated by the contention between the shippers and the vessel owners over rates. The shippers have immense piles of Ore at the head of the lakes demanding immediate shipment. The boat supply is short because the tonnage is being delayed at all docks through the car shortage. The boat owners are demanding higher rates for carrying the material, and the shippers refuse to accede to the demand. Some tonnage has already been tied to the docks to create an artificial shortage of boats, but not enough to affect the market. More may follow. The rates of carriage continue stable at 80c. from Duluth, 70c. from Marquette and 60c. from Escanaba. Little is heard of Ore sales, despite the fact that the season's movement has not yet been covered. Prices do not vary from a basis of $4.50 for Bessemer Old Range and $4 for Bessemer Mesaba.

Pig Iron.—The buyers of Foundry Iron have been in the market during the past week, making inquiries for second half material. These inquiries have been heavy enough to indicate an immense volume of business ahead, but as yet nothing has been done of importance. The slimness of the actual buying is indicated by the fact that no break has been made from the basis of $20, Valley furnace, for No. 2, which, it is now conceded, will not be the prevailing price during the second half. Shipments on old contracts have been heavy, and while the production is enormous, being normal at all stacks, nevertheless the consumption is equal to production in all instances. Some of the makers are displaying a little uneasiness as to business for the second half, because of the backwardness in placing orders. In Bessemer the market has been dull. The product for the third quarter has been well sold up by both the association and independent furnaces. Regardless of this fact, practically nothing has been done or is being done for the fourth quarter delivery. The price established seems to be satisfactory, the deterring influence being a certain indecision as to the possible status of business the last quarter of this year and the first quarter of next year. The immediate developments are interesting in this respect, and further transactions are expected. The market is represented at between $18.50 and $19.35 in the valley. This wide range is due to the variance between the prices asked and received by the association and independent furnaces. Basic producers are still off of the market, desiring to wait until they have cleaned up old orders, and have gotten a line on the Coke outlook for the latter part of the year before entering extensive new engagements. The price is nominally $18.75 in the Valleys.

Finished Iron and Steel.—The Rail trade is beginning to attract attention, as some inquiries are already in for next year. The price for the coming year having been fixed at the old rate, the mills are reaching out for new business. There has been a good call for both Standard and Light Rails for early shipment, the supply of the latter being the heavier. Prices have not changed from $28, Pittsburgh, for Standard, and $36, Pittsburgh, for Lighter Sections. The demand for Plates has been much better on new orders. There have been some new specifications also and the outlook is good. It must be said, however, that the mills are able to make deliveries almost immediately, the best service direct from the mills being possible. The outlook, however, is good enough to warrant the jobbers in taking a firm stand on the question of prices. The smaller mills are getting a little business. Some of them are holding as high as 2c., Cleveland, while others, being in need of business, are offering 1.80c., Cleveland, on choice specifications, and 1.85c., Cleveland, on miscellaneous lots. Structural Steel is not in quite such good demand. The smaller mills are running, having all they can do for the present; but large and small mills alike are a little uneasy about future business. The larger mills are getting inquiries on a good run of business, and the diminution of labor difficulties has started specification. The mills are able to make practically immediate shipment on Small Angles and Large Beams and Channels, while on Small Beams and Channels and Large Angles there is greater difficulty to get material, deliveries being held up three or four months. The jobbers are getting a little business now and then at the same price they have obtained through the last few months. The quotation now ranges between 2.15 and 2.25c. out of stock. The Bar situation is unchanged. The big buyers have not yet covered their needs with a yearly contract and show no change of attitude whatever, buying in small lots from time to time. Some of the smaller consumers, instead of buying for the year, have covered their needs for the second half, expecting to add to these contracts at the end of the year. Bar Iron prices continue to sag, but without any break. Prices are 1.60c., Pittsburgh, for Bessemer; 1.70c., Pittsburgh, for Open Hearth, and 1.70c. to 1.80c., Youngstown, for Bar Iron. The Billet market shows a good call for material with a short supply. Prices hold at between $30 and $31, Pittsburgh, for 4 x 4 Bessemer. The Sheet market is dull, with comparatively little business being done. There are, of course, orders now and then, but they are of little moment. Prices have not changed from 3.15c. for No. 27 Black Sheets out of stock. Black Sheets in carload lots from the mills are based on No. 14, 2.20c., blue annealed, and No. 27, 2.75c., one pass cold rolled. Galvanized Sheets out of stock are based on No. 27 at 4c.

Old Material.—The Scrap market has been dead. Nothing whatever has been done here. The dealers say that they are not quoting prices to the trade, and that any statement of the market now might be very far afield when transactions actually occur. A few sales have been made by one dealer to another to piece out orders. These values are not representative. As near as it is possible to come at a quotation, dealers' prices to the consumers are the following, all gross tons: Heavy Melting Steel, $19.50; Old Steel Rails, $20.50; Old Iron Rails, $24 to $25; Car Wheels, $21; Railroad Malleable, $19.50; Miscellaneous Mallable, $17; Cast Borings, $12. All net tons: No. 1 Railroad Wrought, $19.50; No. 1 Busheling, $16.50; Wrought Turnings, $13; Iron Car Axles, $26; Cast Scrap, $16.50; Stove Plate, $12.50.

The American Tin Plate Company were annoyed by the theft of brass fittings from time to time at their Elwood, Ind., plant, but when the big whistle disappeared the time for complacency was over, and diligent effort resulted in catching the thief leaving the factory at the close of the day with stolen goods under his leather apron. The thefts amounted to $1000 the last six months, it is estimated.

PHILADELPHIA, PA., June 24, 1903.—*(By Telegraph.)*—The conference between the committees of the National Founders' Association and the Iron Molders' Union adjourned last night without a settlement of the question at issue. It was agreed, however, that each committee should report the proceedings to their respective National Executive Committee for consideration and to reconvene this conference. It was also agreed that in the interim no strikes or lockouts should take place.

News by wire from Midway Island, one of the landing places of the Pacific cable, was received in San Francisco for the first time on June 23. A cablegram said that the steamer "Anglia" had left the island for Honolulu, presumably with the last section of the Pacific cable that will connect San Francisco with Manila. The news was sent to Manila over a section just laid and thence by one of the old cable routes. Within a few days, unless unforeseen accidents occur, the line will be in operation direct from San Francisco to the Philippines. This submarine cable reaches some of the greatest depths ever sounded.

New York.

NEW YORK, June 24, 1903.

Pig Iron.—There is quite a volume of business, in moderate lots for early delivery, and a good deal of interest is being shown in the market. It is a fact, however, that the larger buyers do not show much disposition to take hold at the present range of prices. An interesting inquiry is for 5000 to 10,000 tons of Pig for Malleable purposes. It is reported that the board of the Empire Iron & Steel Company has ordered the blowing out of such furnaces leased or owned by the company as are in a poor condition to operate or are not profitable at the present range of prices. This, it is estimated, may lead to the blowing out of four stacks, including a leased Allentown furnace and one Reading. On the other hand, the two new Wharton furnaces at Port Oram and Philipsburg, N. J., will probably blow in next month. We quote, nominally, for delivery at New York and tidewater: Northern No. 1, $19.50 to $20; No. 2 Foundry, $18.50 to $19; No. 2 Plain, $18 to $18.50. Tennessee and Alabama brands, No. 1, $19 to $19.50; No. 2, $18.25 to $18.75, and No. 3 Foundry, $18 to $18.25.

Steel Rails.—The expected announcement of the opening of the books for 1904 delivery at $28 has been made, and there are reports that considerable quantities have been contracted for. The Pennsylvania Railroad is credited with having placed orders for 202,000 tons, distributed, as usual, among the mills along the line of the road. In the trade the action of the Pennsylvania Railroad is perfectly well understood, having been an annual occurrence for many years. The order for 104,000 tons for the Harriman systems has not yet been definitely placed. The Canadian order for 20,000 tons is not yet closed. It is estimated that the successful bidder will have to go close to $25.50, Canadian Upper Lake port. We continue to quote $28 for Standard Sections at Eastern mill.

Cast Iron Pipe.—It is understood that the New York Continental Jewell Filtration Company, who received the contract from the city of New York for improvements in the Brooklyn Water Works, involving the use of 5500 gross tons of large size pipe, have purchased the Pipe from an independent Eastern Pipe foundry. The additional business coming out on account of the same department of the New York water supply, which calls for 10,000 tons, has been let to a contractor who has not yet purchased the Pipe needed. No other large business is immediately in sight. The Eastern foundries are still enjoying a very good demand for small lots. They quote $36.50 per gross ton at tidewater for carload lots of 6 and 8 inch, and $35.50 for 12-inch and upward.

Finished Iron and Steel.—The American Bridge Company report more good inquiries for work in their line than ever before experienced in their history. These inquiries are coming from all sections of the country, but are particularly good in the West and on the Pacific Coast. It would appear from these inquiries that the volume of business in structural work will be sufficiently heavy to fully employ their capacity for the remainder of the year. With the settlement of labor troubles it is expected that contracts will be rapidly placed. The most important orders entered during the week covered a warehouse at Buffalo, which will take 1500 tons, and a number of small buildings for extensions to manufacturing establishments. Among the manufacturers who are prominent in making improvements are the leading makers of Valves. The Pennsylvania Steel Company have secured a contract from the Central Iron & Steel Company, Harrisburg, Pa., for a mill building which will take about 1700 tons. The Plate business is naturally quiet in this vicinity, owing to the labor troubles in the shipyards, the controversy with the striking machinists not having yet been settled. It looks very much as though this matter would be fought to a finish, as the employers are stubbornly resisting the demands of the men. Some orders are being picked up among the boiler makers and the general consumers of Plates, but the quantities thus secured are not large. The Bar Iron trade continues quiet, but manufacturers appear more disposed to close their works than to reduce prices in the hope of securing business. We quote, at tidewater, as follows: Beams, Channels and Zees, 1.75c. to 2c.; Angles, 1.75c. to 2c.; Tees, 1.80c. to 2c.; Bulb Angles and Deck Beams, 1.90c. to 2.25c. Sheared Steel Plates, in carload lots, are 1.78c. to 2c. for Tank, 2c. to 2.10c. for Flange, 2.10c. to 2.20c. for Marine and 2.25c. upward for Fire Box. Refined Bars are 1.80c. to 2c.; Soft Steel Bars, 1.75c. to 1.90c.

Old Material.—Dealers report absolutely no market. Consumers in all lines are holding off for various reasons. The rolling mills are closing down or taking stock, and every letter received from a mill owner states that no Scrap will be bought under the circumstances at any price. The foundries are finding their business affected by labor troubles, and as their output is curtailed, they also refuse to make any purchases until the situation clears up. The demand for Steel Scrap has also fallen off decidedly. Holders of Old Material obliged to sell would be compelled to take prices which undoubtedly would be below its real value. Quotations, which under the circumstances are only approximate, are as follows, per gross ton, New York and vicinity:

Old Iron Rails	$23.00 to $23.50
Old Steel Rails, long lengths	21.00 to 22.00
Old Steel Rails, short pieces	18.00 to 18.50
Relaying Rails, heavy sections	27.00 to 28.00
Relaying Rails, lighter sections	29.00 to 30.00
Old Car Wheels	19.50 to 20.00
Old Iron Axles	27.00 to 28.00
Old Steel Car Axles	24.00 to 25.00
Heavy Melting Steel Scrap	18.00 to 18.50
No. 1 Railroad Wrought Scrap Iron	20.00 to 20.50
Iron Track Scrap	19.00 to 20.00
Wrought Pipe	15.00 to 16.00
Ordinary Light Iron	11.00 to 12.00
No. 1 Machinery Cast Scrap	17.00 to 17.50
Stove Plate	12.00 to 12.50
Cast Borings	8.00 to 8.50
Wrought Turnings	15.00 to 15.50

Iron and Industrial Stocks.

The feature of the week was the attack on the stock of the Colorado Fuel & Iron Company. The fact that certain bills against the company had not been paid promptly was used by the bears as a club in depressing the stock, although the officers explained that the occurrence was due to a misunderstanding which would not occur again, the company being in a position to pay every claim. The course of the market on Tuesday of this week would seem to indicate that if a trap had not been skillfully laid for the bears the effect was the same, as the price of the stock was marked up sharply and the bears were driven to cover at much higher prices. The stock was depressed to 60 on Monday, while on Tuesday as high as 69¾ was paid. The values of other industrials were sympathetically affected by the operations in Colorado Fuel and they were similarly depressed during the week, also recovering to some extent on Tuesday. American Locomotive common, which had declined to 21⅜, sold up to 22½; Cambria Steel declined to 22¾ and sold up to 23¼; Dominion Iron & Steel, which had touched 13½, advanced to 16⅝; Pressed Steel common, which had sold down to 51¾, advanced to 52½; Republic preferred declined to 73⅞ and advanced to 75; Tennessee Coal & Iron declined to 48½ and sold up to 51½; Steel common declined to 28⅛ and advanced to 30¼; Steel preferred sold down to 78⅛ and advanced to 80. The application of A. H. McNeal for a receiver for the United States Cast Iron Pipe & Foundry Company does not seem to be taken seriously, but no transactions occurred in the company's stock during the week; so that the effect of the proceedings on the value of the stock cannot be determined. The disquieting developments in the application by some of the bondholders for a receiver for the United States Shipbuilding Company, added to the other unfavorable matters concerning industrial stocks, has had its effect in causing uneasiness among those interested in these stocks.

Diamond State Steel Company.—At the recent annual meeting of the Diamond State Steel Company, Howard T. Wallace presented a report showing gross earnings of $204,427.68, and net earnings $25,281.83. The gross sales for the year were $3,101,597.90, and the gross expenses $2,897,170.22, and the improvements cost $250,428.78. It was explained that a large part of the sum spent for renewals and repairs, $89,145, and that for betterments, $50,000, were extraordinary expenses, which might not have to be met another year.

Six per cent. preferred stock to the amount of $400,000 of Reeves & Co., Columbus, Ind., out of a total issue of $750,000 is being offered on the market by the Union Trust Company, and J. F. Wild & Co., bankers, Indianapolis, at 105. The sale of the stock is to secure capital to meet the increasing business of the company. The company manufacture threshing machinery and saw mills. It was founded in 1875 by Marshall T. Reeves, who is still at the head of the company. The statement of assets April 18 last shows $2,155,794, and surplus, $1,147,210, not including 42 live patents. The sales last year were $1,395,062. The company's average annual profits the last three years were, according to the statement, $211,990. The preferred stock is increased from $80,000 to $750,000.

United States Cast Iron Pipe & Foundry Company.—Andrew H. McNeal of Burlington, N. J., has begun proceedings in the Court of Chancery at Trenton, N. J., for the appointment of a receiver. At the annual meeting, being held to-day, the following balance sheet, as of May 31, 1903, was submitted:

Assets.

Cost of properties		$24,066,167
Add improvements and betterments during year	60,315	
		$24,126,482
Treasury stock, at cost		347,555
First mortgage bonds of American Pipe & Foundry Company, par value		306,000
*Sinking Fund		68,037
Current assets—		
Bills receivable	$32,912	
Accounts receivable	2,464,815	
Materials, supplies, &c	1,680,018	
Insurance, &c., paid in advance	6,096	
Cash	420,745	
		4,604,585
Total		$29,452,659

Liabilities.

Preferred stock, issued		$12,500,000
Common stock, issued		12,500,000
First mortgage bands of American Pipe & Foundry Company		1,500,000
Current liabilities—		
Accounts payable	$1,112,720	
Accrued bond interest	29,850	
Acrued taxes, &c	13,985	
		1,156,554
Reserve accounts—		
For working capital	$836,545	
For improvements and betterments in lieu of depreciation	105,836	
		942,381
Profit and loss account—		
Profits for fiscal year ending May 31, 1903	$1,370,542	
Deduct: Reserve for improvements in lieu of depreciation, $105,836; interest on bonds, net, $68,555	174,391	
	$1,196,151	
Add: Cash received for rights of way	$16,825	
Dividends on Treasury stock	15,748	
Net earnings	$1,228,724	
Deduct: Amount transferred to working capital, $546,718; †dividends, $500,000	$1,046,718	
	$182,006	
Add: Balance May 31, 1902	671,718	
		853,724
Total		$29,452,659

* For redemption of American Pipe & Foundry Company bonds (72 of these bonds in hands of trustee).
† 4 per cent. on preferred stock.

The statement is audited by the Audit Company of New York, which certifies it to be a true exhibit of the condition of the company as of May 31, 1903, as shown by its books and accounts.

The report states that the company have no bills payable.

The Norton Emery Wheel Company of Worcester, Mass., have increased their capital stock $102,000, making it $408,000. The increase consisted of capitalizing surplus earnings.

Dividends.—E. W. Bliss Company have declared a quarterly dividend of 2 per cent. on the preferred and 2½ per cent. on the common stock, payable July 1. Books close June 24.

The regular semiannual dividend of 3 per cent. on the preferred stock of the Alabama Steel & Ship Building Company, guaranteed by the Tennessee Coal, Iron & Railroad Company, will be paid July 1. Books close June 25 and reopen July 2.

American Smelting & Refining Company have declared the usual quarterly dividend of 1¾ per cent. on the preferred stock, payable July 7. Books close June 24 and reopen July 8.

Lebanon Valley Iron Company have declared a semiannual dividend of 3½ per cent. on the preferred stock, payable July 1.

Nova Scotia Steel & Coal Company have declared a quarterly dividend of 2 per cent. on the common stock, payable July 1.

American Shipbuilding Company have declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable July 15.

Westinghouse Electric & Mfg. Company have declared a dividend of ⅞ per cent. upon the preferred stock out of earnings from April 1, 1903, until May 15, 1903, and a dividend of 1¼ per cent. out of earnings from May 15, 1903, to July 1, 1903, making a total of 2⅛ per cent., payable July 10 next. Books close June 22 and reopen July 11. The company also declared a dividend of 1¼ per cent. upon the assenting and nonassenting stock out of earnings from May 15, 1903, to July 1, 1903, payable July 10. Books close June 22 and reopen July 11. Vice-President Kobbe, in explanation of these dividends, states that the action was in pursuance of the statement made in the circular recently issued to the shareholders to the effect that the dividends on all classes of stock would be adjusted so as to become payable on the same date.

Cincinnati Machinery Market.

CINCINNATI, OHIO, June 22, 1903.

A review of the machine tool interests of Cincinnati and vicinity indicates a very prosperous condition of affairs. New plants are being erected and old ones enlarged with a general condition of activity prevailing. The Industrial Bureau of this city has just completed arrangements for another new industry to locate here. It is a plant for the manufacture of a patented machine for the placing of tires upon wheels while the steel is cold. The patent and plant belong to E. McGovern, who is now located in Lime Rock, Conn. This proposition has been in the hands of the bureau for some time. McGovern desired to enlarge his plant and move West, and came to this city to investigate. He found this a desirable location, and agreed to move here if a company were formed to take over the business. This company, with a capital of $40,000, is now being formed with Harry Irwin of Shaw, Irwin & Co., Wm. Lodge of the Lodge & Shipley Machine Tool Company and Jacob Dietz of the Dietz Machine Tool Company as the principal stockholders. The plant will be moved at once, and have temporary quarters with the Lodge & Shipley Company on Colerain avenue until a site can be obtained and a building erected.

The Stewart Architectural Iron Works are preparing to build another large plant in Covington on the site adjoining the one on which a building is now being erected. The plant now under construction is located at Seventeenth and Madison streets, Covington. It will be two stories in hight, and will give employment to several hundred men. Directly in the rear of the new building is an old frame one which is being used at this time for the manufacture of the company's jail work. This building will be moved southward several hundred feet so as to front on Eighteenth street, and upon the ground vacated will be erected the new building. The plans for this structure are similar to the one now being completed but of greater dimension. It will be directly in the rear, and will front on the Chesapeake & Ohio and L. & N. railroads.

The beginning of work by the B. & O. management upon what will be the largest freight depot and warehouse in the world upon its site in the bottoms marks the inauguration of the many terminal projects outlined by the different railroads entering the city. These terminals call for the expenditure of $650,000. The Southern terminal, which will extend to Race street, will cost over $1,000,000. The L. & N. terminals, adjacent to these will extend eastward to Vine street, and the buildings theron will probably cost equally as much as those of the others, and will be of iron and steel construction.

The boiler making industry of this city has been involved in a strike, which includes the entire membership of the local Boilermakers' and Iron Shipbuilders' Union, practically tying up every boiler shop in town. The committees, however, are at work arbitrating affairs, and it is expected that all will be soon satisfactorily settled. Considerable uneasiness and unrest is manifest in all iron circles as to the strike question. And while trade is excellent and business flourishing there is underneath it all that subtle fear that at any moment something in this line may arise and cause a demoralization of all plans for the future.

The Lodge & Shipley Machine Tool Company are having an exceptional rush of trade, and are directing all their energies to the completion of contracts secured some months since.

The Bollman-Wilson Foundry Company are crowded in both their Cincinnati and Norwood plants, with their order books filled for the future. They are now at work on plans for the expansion of their Norwood foundry, which, when completed, will about double the capacity of this plant.

Smith & Mills are enjoying a good, steady flow of trade, with no special features worthy of mention.

The Blymyer Company are having an unusually large demand made upon them for Sugar Mills in the Southern States and in Cuba. They report business increasing in the Philippine Islands and predict a great future for trade in our new possessions.

Schumacher & Boye expect soon to occupy their new buildings, which they have been erecting for several months past. They have been considerably delayed by building trades strikes and inability to receive material, but are now out of the woods. They have all they can do and are well satisfied with trade conditions as they find them.

The Cincinnati Machine Tool Company, as noted in *The Iron Age* several weeks since, are at work on plans and specifications for their new plant. All the necessary preliminary steps have been taken and the building will be rapidly pushed to completion. They are very busy and hope soon to be in a position to promptly take care of all orders offering.

The Dreses Machine Tool Company are receiving their full share of orders and have no complaints to make. Their additional building, recently erected, is now being utilized and adds very materially to the capacity of their floor space. Foreign trade seems to be somewhat better.

The Pothoff & Frey Architectural Iron Company are having their hands full in looking after the buildings now being erected in our city. They are estimating on several large contracts which, if secured, will keep them busy for some months to come.

The I. & E. Greenwald Company, makers of engines and gears, report the month of May as one of the busiest in their history. There is a general demand for their engines and gearings which seems to be greatly on the increase. With the added facilities as to switches in and out of their plant and the recent addition of several hundred feet of floor space, they are now prepared to make prompt delivery on all orders.

The Bickford Drill & Tool Company are gradually catching up in orders booked several months since. They report trade unusually active, with the railroads as very heavy buyers. Orders which are generally distributed are coming in and all indications point to a prosperous year.

The Queen City Shaper Company, located at Sycamore and Webster streets, are about ready to commence opera-

tions. They have purchased their tools, which are mostly of Cincinnati manufacture, and hope soon to rapidly expand.

The J. A. Fay & Egan Company are doing an immense business, both foreign and domestic. They have recently received orders for large consignments of their tools from their London agent, as well as from domestic sources. They still have the erection of their plant at Bond Hill under consideration and will no doubt make the change of sites when such a move is deemed expedient.

The Lane & Bodley Company, builders of engines, are now occupying their new foundry at Bond Hill. They report a very heavy demand for their engines from the Southern States and are well pleased with the outlook of trade generally.

The Sebastian Lathe Company report trade as fair, with a easy demand for their tools, which they are able to supply promptly.

The New York Machinery Market.

NEW YORK, June 24, 1903.

Evidences of a disposition on the part of intending purchasers to defer placing their orders have multiplied during the week under review. There are still a number of large projects in view which appear to have retained life and which from present appearances will be carried through. General business has fallen off to a marked degree, however, and complaints of a considerable decrease in inquiries and orders are heard in all quarters of the trade. The sudden lull which is being experienced now has, however, been of too short duration to cause a hungriness in the trade sufficient to entail extensive price cutting. Advices received in the trade here indicate that business in the West is somewhat better than in this market.

Exporters report that American machinery builders are now paying better attention to foreign business. We are informed by several concerns who, until a comparatively recent date, shipped large quantities of American machinery abroad, that some of the manufacturers who formerly sold them considerable machinery for exporting have within the last two or three weeks offered some concessions in price with a view of taking a fresh hold on this kind of trade.

Tne export houses claim that substantial reductions in prices must be made by the American manufacturers before an attempt can be made to reintroduce their products abroad, and they say that the American manufacturers show signs of complying with the necessary conditions. One large export house, who formerly shipped machinery from this market by the shipload, principally for the Orient, have recently been filling their requirements from the European markets. This has necessitated their opening offices in England and on the Continent and has brought them in close touch with the European producer. Having been thus enlightened as to what Europe can furnish, they say that American producers must now do considerably better by them than they did five or six years ago, when they handled American machinery exclusively. These exporters, who went to Europe for their supplies when American prices became prohibitive, have discovered many good machines built abroad which they are securing at very low prices. They report also that they are able to obtain very prompt deliveries in Europe.

The M. S. Friede Company of 71 Broadway, New York, are now buying a very extensive mining equipment for the Far East, and while some of the machinery may be purchased in this country, owing to the disposition to make concessions on prices which the American machinery builders are showing, it may also be necessary to secure some of the equipment in Europe. Mr. Friede has just returned from Europe and he reports that machinery builders in England and Germany are showing much enterprise in reaching out for Oriental trade.

In a short time about $5,000,000 worth of equipment will be purchased by the Russian Government for the construction and equipment of the Trans-Caspian Railway. While the Russian Government went to a great deal of expense a short time ago in investigating American railway methods, going as far as to send men to secure employment in American railway shops, it is the opinion of several exporters who are in a position to know whereof they speak that practically all of this equipment will be secured in Europe. This opinion is, however, based on the assumption that American machinery producers maintain the independent stand which has caused them to forfeit much foreign trade.

The slackening of trade in this country is taken by the exporters as a sign that American manufacturers will again direct their attention in the direction of foreign fields, and it is thought that many will regret having loosed their grasp on this trade, and if their efforts to regain it are successful, will in the future look more favorably upon the idea of making some efforts to retain it.

It was expected that the Fuller Cotton Gin Company of Memphis, Tenn., would shortly be in the market for a good sized lot of machinery for their proposed new plant. It seems now that nothing will be done in the matter for some time, as James T. Fuller informs us that business conditions have been such that they have found it absolutely necessary to contract most of their work for the present cotton season, and will defer building operations until early fall.

The Buffalo Forge Company of Buffalo, N. Y., who have recently acquired the entire plant of the Buffalo Steam Pump Company of North Tonawanda, N. Y., are purchasing such machinery equipment as will be necessary to bring the shops thoroughly up to date. Large orders have already been placed. It is intended to operate the works to their fullest capacity.

The Sessions Clock Company, Bristol, Conn., of which William E. Sessions, president and treasurer of the Sessions Foundry Company is also president, are building two additions to their plant. The buildings will be 50 x 100 feet each, one three stories and the other one story.

Fay & Scott, Dexter, Maine, makers of engine and pattern makers' lathes, have recently installed several new tools in their shop, and have broken ground for an addition to their foundry, which, when completed, will double their capacity. They are in the market for a traveling crane and additional foundry equipment.

Twenty-three machine tools, including lathes, milling machines, shapers and drill presses, and also an automatic engine, are required by the Emmert Mfg. Company of Waynesboro, Pa. The company expect to have their new machine shop, 45 x 125 feet, ready for occupancy about the middle of August, at which time they also hope to complete the erection of a new storage and office building, 40 x 68 feet, two stories. They are having a continued heavy demand for their Universal wood workers' and tool makers' vises.

The Cincinnati & Muskingum Valley Railway, a Pennsylvania property, are planning to double the capacity of their repair shops, at Lancaster, Ohio. Considerable new machinery has been contracted for, and some of it is already on the way. The step has been made necessary by the enormous amount of repair work on this division.

The American Frog & Mfg. Company of Kansas City, Mo., have placed orders during the last week for equipment for their new shops. They have placed an order with the Ajax Mfg. Company of Cleveland for one 1½-inch heading, upsetting and forging machine, one 3-inch heading, upsetting and forging machine, one No. 7 bulldozer, and with various other manufacturers for seven special frog and switch planers, from 36 to 48 inches; one double combination punch and shear, two rail benders, two Newton cutting off saws, one 1500-pound steam hammer, one Morton special frog and switch shaper, one No. 4 Cincinnati milling machine, three engine lathes, 16, 20 and 36 inches; one 18-inch slotter, one 10-ton Shaw traveling crane, one No. 8 Whiting cupola, with complete foundry equipment; four Buffalo railroad forges, one Buffalo No. 39 E down draft heating forge, together with numerous smaller machinery necessary to complete new and modern shop. The officers of the company are: H. F. Reddig, president; W. G. Humphrey, secretary and treasurer; F. W. Fritchey, manager of works.

The Cleveland Stone Company have placed an order with the Ingersoll-Sergeant Drill Company for what promises to be a long step forward in the history of compressed air for quarry work on a large scale. The compressed air plant will be located at the Stone Company's No. 6 Quarry, North Amherst, Ohio. The building, as planned, is a structure 80 x 130, and the entire plant complete will cost $130,000. While the Stone Company furnishes foundations, building and does the excavating, the Ingersoll-Sergeant Drill Company practically furnish the complete plant in running order. The plant will consist of two large Ingersoll-Sergeant Corliss condensing air compressors, 48-inch stroke, semi-Tangye frames, having a combined capacity of 9215 cubic feet free air per minute. Steam and air ends are compounded and of the highest refinement in economy throughout; also three Stirling water tube boilers, 258 rated horse-power each, to carry 180 pounds working steam pressure, two Independent jet condensers, two Duplex boiler feed pumps, two Duplex auxiliary low service pumps, three Roney mechanical stokers, one fan draft, water purifier system, &c., including some 10,000 feet of large air pipe and fittings as the main feeder around the quarry. The plant is expected to be in operation by September next. Among the machinery to be handled are: Nine powerful hoisting stations, handling 22 derricks, some 15 channeling machines, 15 rock drills, pumps, blacksmith's fires, steam hammer, grind stone and shop engine. So many radical changes over the whole system of quarrying are in contemplation that it is safely expected by the company to increase the output 25 to 50 per cent. with the same labor force, cut down the coal consumption two-thirds and cheapen the cost of production to a very material extent. Subcontracts for the various portions of the equipment not produced by themselves are now being awarded by the Ingersoll-Sergeant Drill Company from their New York offices, 26 Cortlandt street.

Increased attention is being paid to the development of water powers for both electric lighting and power purposes. Following closely upon the project to develop the waters of the Farmington River in the western part of Massachusetts, mentioned in these columns two weeks ago, comes the an-

nouncement of the organization of the Eastern Connecticut Electric Power Company, who are to take up the development of several large water powers in the eastern part of Connecticut, with the view to supplying from 5000 to 7000 horse-power to electric light and street railway companies and industrial plants. The engineering in connection with the whole project is in the hands of Lockwood, Greene & Co., 95 Federal street, Boston, who are now getting out plans and who will purchase all equipment required. As the engineers have just about started on the plans it will probably be a month or two before they will be ready to take up the matter of machinery. The company are incorporated with a capital stock of $100,000, which will shortly be increased to $800,000. The officers are: President, F. A. Jacobs, president of the Worcester & Connecticut Eastern Street Railway Company, Danielson, Conn.; vice-president, R. L. Warner of the Westinghouse Electric & Mfg. Company, at Boston; secretary and treasurer, Thomas C. Perkins, Hartford, Conn.

The American Coke & Gas Company, 17 Battery place, New York, who recently received contracts for the construction of two large gas producer plants, one at Johnstown, Pa., and the other at Duluth, Minn., have completed purchases of equipment. These plants are to be built according to the Otto-Hoffman system.

Metal Market.

NEW YORK, June 24, 1903.

Pig Tin.—There is very little of interest in this market. Prices have declined somewhat, as compared with last week, and demand is still very light. Quotations at this writing for spot to June range from 28.12½c. to 28.37½c. Deliveries for later months can be obtained at considerably lower prices, but no disposition is being shown to take advantage of this condition. The London market has also declined considerably from last week, and was cabled at the close to-day £127 for spot and £125 5s. for futures. The arrivals to date aggregate 2420 tons, while the afloats foot up to 3185 tons. It is expected in the trade that the monthly shipments will amount to 5000 tons, which amount is large.

Copper.—Notwithstanding reductions in prices which have been made since our last writing, the market is just as dull as ever. Very little business is reported. On Saturday last it was reported in the trade that the Calumet & Hecla Company had cut their prices to a basis of 14.50. As it was generally known that Calumet & Hecla had been previously holding out for 15.50c., the cut amounted to just 1c. It is generally believed that the report is correct, as the Quotation Committee of the New York Metal Exchange immediately reduced their prices to the same basis. These "official" prices are now 14.50c. for Lake and Electrolytic and 14c. for Casting stock. The London market has declined to £56 7s. 6d. for both spot and futures. Best Selected has declined 5 shillings to £61 15s., which brings the London price a little below 13c. Exports so far this month have footed up to 5686 tons, as against 8929 tons for the corresponding period of last year. It is said in the trade that there is really no export business at all at this time, as prices abroad are so much lower than those ruling here. The shipments which are being reported at present, it is said, are made on old contracts.

Pig Lead.—There is no change here. The official price is still 4.12½c. for Desilverized in carload lots, and 4.10c. for 50-ton lots. St. Louis quotes 4.02½c. London took a rather wide jump to-day, going to £11 15s. from £11 2s. 6d., which was the ruling price yesterday. This unusual advance is thought to have received its inspiration from this side of the ocean.

Spelter.—Spot is still very scarce here, although the price is a shade lower than last week. Yesterday spot declined to 6c., but the demand which accompanied this reduction sent the figure back to 6.12½c. to-day. There is still considerable interruption in the transportation facilities between St. Louis and this market incident to the recent floods. Shipments from the West are quoted at 5.75c. St. Louis telegraphs that July shipments can be had at 5.55c. The London market declined to the lowest point reached this year, namely £19 15s.

Antimony.—While the price of Cookson's remains unchanged, at 7.50c., Hallett's and the other brands have suffered a ¼c. reduction. Hallett's is now quoted 6.75c. and other brands 6.50c.

Nickel—Is quoted at 40c. to 45c. for large quantities and 50c. to 60c. in small lots.

Quicksilver.—A moderate business is reported, the market ruling at $47.50 for flasks of 76½ lbs.

Tin Plate.—No change worthy of note has occurred in this market, which remains firm. Current transactions are of moderate proportions. Prices remain firm. The American Tin Plate Company's quotation continues at $3.80 per box of 14 x 20, 100 pounds Cokes, f.o.b. mill, which is equivalent to $3.99, New York.

The United States Cast Iron Pipe & Foundry Company.

Andrew H. McNeal of Burlington, N. J., has made application to the Court of Chancery, Trenton, N. J., to appoint a receiver for the United States Cast Iron Pipe & Foundry Company, with a view to winding up the affairs of that company. The company are owners of 14 plants, among the number being the plant of the former McNeal Pipe & Foundry Company of Burlington. The other plants are located at Buffalo, New York, Columbus, Cleveland and Addyston, Ohio; Newport and Louisville, Ky.; West Superior, Wis.; Scottdale, Pa.; Anniston, Bessemer and Bridgeport, Ala., and Chattanooga and South Pittsburg, Tenn. Mr. McNeal charges that through mismanagement the plants at West Superior, Bridgeport, South Pittsburg and Newport have been dismantled, wrecked and rendered useless. Charges of other extravagance and expensive management are made and also that the operations of the company are conducted more for the exploitation of the stock than the practical operation of the works. Mr. McNeal asserts also that many of the statements contained in the newspaper publications concerning the earnings of the company and their profits were untrue in many material points and were calculated to deceive the stockholders and prospective stockholders. Other pipe manufacturers, it is asserted, have made large profits during the period covered by the operations of the company and have declared as high as 20 per cent. dividends. Under proper management, it is said, the company would be paying annually a 7 per cent. dividend on the preferred and 5 per cent. on the common stock. Payments are now being made of 1 per cent. quarterly on the preferred stock, while no dividends have been paid on the common stock. Unless restrained, Mr. McNeal avers, further dividends will be declared and paid out of the company's capital, and he charges that if the mismanagement continues it will necessarily result in the suspension of business.

An official statement has been issued by Benjamin F. Haughton, secretary and treasurer of the company, in which the following declaration is made: "The statements made by A. H. McNeal in his application to place the company in the hands of a receiver are absolutely without foundation in fact. The company have just closed the most prosperous year they have ever had. The annual meeting of stockholders will take place Wednesday, when the stockholders will be given a full report of operations for the past year. We have every reason to believe that the report will be satisfactory to stockholders. The financial condition of the company is stronger than at any time since their formation four years ago, and the present outlook for business is very good."

At a recent meeting in Indianapolis the Mechanical Spark Generator Association of America was organized. The men present represented all but two of the factories in the United States. The following officers were elected: Prsident, V. G. Apple, Dayton, Ohio; secretary-treasurer, B. E. Tritt, South Bend, Ind.; Advisory Committee: E. R. Harding, Chicago; H. N. Motsinger, Pendleton, Ind., and Frank Remy, Anderson, Ind. The purpose of the association was stated to be to bring the spark generator manufacturers in closer touch, to discuss the proper line of improvement and the best application of mechanical spark generators to gasoline automobiles, launches, stationary engines, &c., and to do what is possible for the general betterment of the industry. The industry is a comparatively new one, less than nine years old, and is growing rapidly, principally owing to the development of automobile manufacturing.

The conference between the Amalgamated Association Committee and the Youngstown Iron Sheet & Tube Company, at Youngstown, Ohio, on June 20, lasted for some hours, but no agreement was reached in regard to the sheet mill scale at this plant. The company have a number of very important labor saving devices, and for this reason have asked certain concessions in the scale.

HARDWARE.

THE Saratoga meeting, under the joint auspices of the jobbers and manufacturers, promises to be a notable gathering. The coming of the Southern merchants into Northern territory is a new departure and a hearty welcome will be extended to them by the manufacturers, who will be present in full force. It is likely, too, that there will be a number of representatives of Northern jobbing interests, so that the gathering will be a representative one, especially if an invitation is extended to the officials of the NATIONAL RETAIL HARDWARE DEALERS' ASSOCIATION to represent the great retail interests of the country, with which both manufacturers and jobbers are so closely identified.

The arrangements which have thus far been completed make it evident that the principles of the strenuous life are to be applied even in Saratoga in midsummer. The serious and laborious attention of the delegates is to be given not only to business and the consideration of grave trade problems, but also to the pursuit of pleasure, as each of the four days of this felicitous coming together of North and South, of manufacturers and jobbers, of competitors and customers and a host of ladies, is to have its part in the entertainment provided, whether it be one reception or another, the house warming, the carriage drive, the musicale, the smoker, the dance, the banquet, or some other feature, which with alluring reticence "is still to be announced." And all this is to be enjoyed in the midst of the warmth and brilliance of Saratoga in July! It would seem the part of wisdom for the delegates to go at once into training.

It would, however, be a mistake to suppose that pleasure is the object of the gathering. These recreations are only an incident in connection with laborious deliberations on important, many sided and difficult questions. The announcement made in another column of the subjects to be discussed will indicate, as far as a mere outline can, the variety and breadth of the questions which will be considered in this joint assembly of manufacturers, jobbers and possibly retailers. It will be seen that there is a round dozen of topics which are to be discussed in the open sessions, to say nothing of the questions which will be taken up behind closed doors. These subjects for the consideration of the convention have been prepared with care and skill, and every one of them should be the basis of interesting and profitable deliberation. The work of the Southern Association in stimulating such discussion, with a view to discovering tendencies in trade, emphasizing principles which should be followed and correcting inequities and mistakes, deserves the heartiest commendation. Nothing but good can result from a full and frank expression of views by manufacturers and merchants on these topics of practical and perennial interest. That some of these problems do not admit of any final or definite solution, or will indeed be determined outside of convention halls under the operation of the laws of trade which have little regard for opinions or precedents, is obviously no reason why they should not meanwhile be debated.

There is a pleasant variety, too, in the subjects. Some of them are definite and specific, while others are exceedingly broad and comprehensive, giving an opportunity for a diversity of treatment and the bringing in of a wide range of suggestions and opinions. Thus the question, not now propounded for the first time at such gatherings, "What should be the policy of the manufacturers in the distribution of their products?" will give to the jobbers, whether of the North or South, a chance to define as strictly as they like the channels through which, in their opinion, goods should reach the trade; while, on the other hand, a discussion of "The Hardware Jobber, His Past, Present and Future," will give an opportunity for the manufacturers, not so much to get back at the jobbers, as to dwell in genial spirit on the history of the trade, the pleasant relations of many years and the splendid future which opens up before the jobbers as the intermediaries in the distribution of goods. But as both of these subjects assume a somewhat different aspect and become at once more complicated when the views and interests of the retailers are considered, before finally settling them, perhaps, it would be well to hear from the retail merchants.

A thoroughly serious vein, befitting the gravity of the problems under discussion, characterizes most of the topics, but the one about the propriety of manufacturers selling houses who have been dropped from the lists of syndicate buyers as not entitled to be regarded as legitimate jobbers, has in it a delightful touch of humor. There was doubtless a twinkle in the eye of the author as he framed the question, thinking of how the manufacturers would, during the discussion, try to look serious, perhaps innocent, in view of the fact that almost every one of them is selling more or less openly and gladly hosts of houses who are not deemed by the NATIONAL HARDWARE ASSOCIATION big enough to be represented by a syndicate buyer. But this question, as are also the others, is well phrased to call out an interesting debate, and thus will do its part in making the Saratoga meeting an abounding success. The cordial and broad invitation to attend, which goes out to the trade from both the SOUTHERN HARDWARE JOBBERS' ASSOCIATION and the AMERICAN HARDWARE MANUFACTURERS' ASSOCIATION, will contribute much not only to the numbers, but also to the pleasure and usefulness of the gathering.

Condition of Trade.

There is on the part of manufacturers more attention being given now to the closing up of the half year's business, getting things in shape for the summer and in general planning the outlines of the fall campaign, than to the active securing of orders. The quiet season which generally comes at this period is thus utilized in finishing up the work of the past, and getting in readiness for efficient manufacture and marketing of their product during the remainder of the year. With the larger buyers, who sometimes anticipate their wants at this time, there is a disposition to hold off a little, taking the view that prices are not at all likely to go higher and may in some lines at least yield a little, making it the wiser policy to preserve a waiting attitude until the markets get into a more definite and settled shape. The weakness which has shown itself in some sections of the Iron market is generally regarded as far from an unmixed evil, as it is simply the coming down to a reasonable basis. While in heavy goods the effect of a decline of raw material would be to permit lower prices, it is to be borne in mind that in the great mass of manufactured Hardware the lower costs on this account would be comparatively trifling, and in many lines would not set off the increased cost, owing to advances which have been taking place in labor, a tendency which has not yet altogether ceased. There is thus not so much the apprehension of lower prices or of a serious interruption of the existing consumption, which

is, after all, the prime factor in determining the character of trade, as a disposition to await developments and purchase goods a little later under the assurance that most lines will be readily obtainable, especially in view of the increased facilities of the manufacturers which are now beginning to relieve the market. There is also some uncertainty as to the crops, which this year have been subject to a variety of influences which make it difficult to forecast with definiteness what the harvests will show. Fortunately the question does not seem to be whether the crops will, in the aggregate, be poor or good, but how much they will be above the average. While there is thus a disposition to hesitate and take breath on the part of the manufacturers and large merchants, the consumption of goods goes on apace and the country enjoys the prosperous conditions which have so long prevailed.

Chicago.

(By Telegraph.)

The latter part of June is usually a very quiet period in the Hardware trade and this year is no exception to the rule. The general experience in the jobbing trade, however, is that the volume of business is somewhat in excess of the corresponding period a year ago. This is attributed to the fact that not a few orders which under ordinary conditions would go to St. Louis have been finding lodgement in this market, it being feared that there would be delays in transportation from the flooded district. But aside from this little increase in business there have been no features developed in the jobbing trade worthy of special comment. Stray orders are still received for Hay Forks and a few other small Agricultural Tools, and Lawn Mowers have continued to sell quite well. Straggling orders are also being received for the fall line of goods, including Lanterns, Axes, Scoops and Edge Tools, but they are without special significance. The scarcity noted in Tin Plate has not been relieved, but the mills are reported to have gained largely in shipments and relief is in sight. However, building operations have fallen off quite considerable from what they were during March and April, so that there has been less urgency in the demand for Tin Plates for roofing purposes. Wire Netting is also still difficult to obtain. Manufacturers' agents of Shelf Hardware report some desirable business booked for Southern points, such as Louisville, and other points on the Ohio River. Some business also of this nature has been taken in Detroit and nearby territory. Builders' Hardware, on the other hand, has been extremely quiet, city trade being light and the orders from the country less than usual in the aggregate, although one or two dealers report a fair business. Little has been heard of the large contracts which have been pending, it being reported that all bids which have been received for the traction building at Indianapolis were too high and the matter is held in abeyance. A feature of some prominence is the unusual strength with which Nails and Wire and other staple articles of a similar character are being held by manufacturers. Usually at this season concessions are made in prices for fall shipment. This year, however, will probably be an exception to the rule, as the determination is to hold strong at present prices. However, while it seems assured that there will be no decline, consumers on the other hand feel equally confident of no advance; hence there is no disposition to place many orders. The usual competition among jobbers, however, is said to be responsible for some slight concessions in the prices of Nails to distributors, but such instances, if any, are few and far between and not of any significance. The new tonnage being taken by manufacturers for staple lines, including Nails and Wire, is slightly in excess of the tonnage booked at this time a year ago; but while jobbers are not buying freely at the present time, manufacturers continue to place fair orders for Shafting, Screw Stock, Spring and Machinery Steel. Implement manufacturers and Steel companies are in the market for Tool Steel, and contracts for the season's requirements will probably be placed between now and July 1. The merchant trade in Bars, Rounds, Bolts, Nuts, Chain, Washers, Sheets and similar heavy lines has been quite satisfactory for the season, showing some improvement over June of a year ago. Dealers report no improvement either in the present or early prospective supply of Spokes, Hubs, Rims and other Wagon Material, for which they have standing orders at full prices.

St. Louis.

(By Telegraph.)

The jobbing trade report a continuance of the good volume of orders, which goes to show the hopeful view of the dealer in future market conditions, notwithstanding the unsettled condition and losses brought about through the recent floods, &c. The makeup of the present requirements covers very generally the seasonable staple lines and specialties. Locally building conditions show a shrinkage of a considerable amount, when comparison is made with the figures of last year. This fact, of course, is largely due to labor troubles and the high cost of building materials. Figures just out show that there has been a decrease of 24 per cent. in building permits granted, as compared to a similar season in 1902. The heavy department of the market is sharing in a very fair demand, with features of any particular note lacking.

NOTES ON PRICES.

Wire Nails.—The lack of active demand continues and requirements of most buyers are covered by their contracts. The season and continued labor disturbances are largely held responsible for this condition of the trade. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$2.00
Retailers, carload lots	2.05
Retailers, less than carload lots	2.15

New York.—The local conditions of the market remain unchanged, demand being much hampered by labor strikes. There is a steady but small distribution of Nails. The market is firm at the following quotations: Single carloads, $2.20; small lots from store, $2.25 to $2.30.

Chicago, by Telegraph.—The demand for Wire Nails has shown no improvement as far as new business is concerned, and yet the tonnage being booked compares favorably with a year ago, and specifications on previous commitments continue ample to keep the mills busy. Manufacturers state emphatically that prices will be maintained, and those who have been looking for the usual decline at this time of the year seem doomed to disappointment. Competition for new business is said to have induced some jobbers to make concessions, but this seems to be a matter of considerable doubt. Quotations continue at $2.15 to $2.20 in carload lots, f.o.b. Chicago. Broken cars sell at 5 to 10 cents higher. For Galvanizing 75 cents per keg and for Tinning $1.50 extra per keg is charged.

St. Louis, by Telegraph.—A fairly active demand continues for Wire Nails, and jobbers are quoting $2.35 in small lots from store.

Pittsburgh.—There is a fair amount of new business being placed in Wire Nails, but the market is generally quiet. This is due largely to the numerous strikes in the building trades, which have restricted demand to considerable extent. In view of the continued scarcity of Steel and the comparatively high prices ruling on Rods, it is not believed that prices of Wire Nails will be any lower for some time than they are now. This is giving a confident tone to the market, which is quite firm. We quote $2 in carloads to jobbers, $2.05 in carloads to retailers and $2.15 in small lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days. For galvanizing Nails 75 cents per keg is charged and for tinning Nails $1.50 per keg extra.

Cut Nails.—A meeting of the Cut Nail Association will be held on the 25th inst. The available supply of Nails is equal to the demand, but the mills still experience some difficulty in securing the needed Steel. The market is firm and quotations are as follows: $2.15, base, in carloads and $2.20 in less than carloads, f.o.b. Pitts-

burgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—The requirements of the trade are of a moderate character, owing to the lack of building operations. The market remains firm and quotations for carloads and less than carloads are as follows: Carloads on dock, $2.29; less than carloads on dock, $2.33; small lots from store, $2.40.

Chicago, by Telegraph.—There has been a further falling off in the demand for Cut Nails, and with an ample supply of Steel and fairly adequate transportation facilities shipments are being made quite promptly. The market remains steady, however, on the basis of $2.30 in carload lots and $2.35 in less than carload lots for Steel, Chicago; Iron Nails are held at $2.45 to $2.50 per keg from store.

St. Louis, by Telegraph.—The moderate demand upon the jobbing trade for Cut Nails has been well sustained. In small lots from store quotations are as follows: Steel, $2.45; Iron, $2.55.

Pittsburgh.—Demand for Cut Nails is only fair, and mills are shipping out very promptly. The tone of the market is firm, but prices are without change and are as follows: Steel Cut Nails, $2.15, base, in carloads and $2.20 in less than carloads; Iron Cut Nails, $2.25, base, in carloads and $2.30 in less than carloads, plus freight in Tube Rate Book to point of destination, 60 days, less 2 per cent. off in 10 days.

Barb Wire.—Orders received have been for smaller quantities, the requirements of the trade being met by specifications on contract orders placed some time ago. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$2.30	$2.60
Retailers, carload lots	2.35	2.65
Retailers, less than carload lots	2.45	2.75

Chicago, by Telegraph.—The specifications received on old contracts are sufficient to keep the mills busy, and while new business is not large, it is equal to the corresponding time a year ago; in fact, some little increase is noted. There seems to be no prospect of lower prices either for summer or fall delivery; in fact, the market is unusually firm for this time of the year. Galvanized Wire is selling on the basis of $2.75 to $2.80 in carload lots and Painted at $2.45 to $2.50, the outside price being to retailers. For small lots 5 to 10 cents extra is charged. Staples in carload lots sell as follows: Polished, $2.30 to $2.35, and Galvanized, $2.70 to $2.75, the outside price being to retailers.

St. Louis, by Telegraph.—The jobbing trade report a quiet order of affairs for Barb Wire. Quotations are as follows: Painted, $2.65; Galvanized, $2.95, in small lots from store.

Pittsburgh.—Current business is for small lots only and the mills are running mostly on contracts placed some time since. Prices are fairly firm and are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, $2.30; Galvanized, $2.60, in carloads to jobbers; Painted, $2.35; Galvanized, $2.65, in carloads to retailers; Painted, $2.45; Galvanized, $2.75, in small lots to retailers.

Smooth Fence Wire.—The demand continues active, in addition to specifications received on contract orders. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.90
Retailers, carloads	1.95
Less than carloads	2.05

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago, by Telegraph.—The demand for Wire Fencing and also for Fence Wire has continued on a liberal scale and, with specifications on old contracts, keeps the mills considerably behind in the filling of orders. A firm tone has continued to prevail, the following prices being current: Nos. 6 to 9 sell at $2.05 to $2.10 in carload lots on track, and $2.15 to $2.20 in less than carload lots from store, Galvanized bringing 30 cents extra for Nos. 6 to 14 and 60 cents extra for Nos. 15 and 16.

St. Louis, by Telegraph.—Fairly active demand rules the market for Fence Wire. Jobbers have made no change in quotations, which are as follows: No. 9, $2.35; Galvanized, $2.65.

Pittsburgh.—New demand is fairly active and this, with specifications on old contracts, keeps the mills pretty fully employed. There is no change in prices, which are as follows: Plain Wire, $1.90, base, for Nos. 6 to 9 in carloads to jobbers, $1.95 in carloads to retailers and $2.05 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14 and 60 cents extra for Nos. 15 and 16.

Registers.—Herewith we give a revised list of Registers which has been adopted by a majority of the important manufacturers of these goods and will probably be adopted by all makers as the standard list. The list takes effect July 1, 1903, and is subject to a discount of from 70 to 75 per cent. Comparatively few prices of Black Japanned Registers have been changed, and most of these are in the nature of a slight reduction. Changes in Register Faces, of which there are quite a number, show slight advances. The larger number of Floor Borders are changed in price, in most cases making a marked advance over the former list. White Japanned Registers and Faces have generally been reduced in price, and Frames are practically unchanged.

Registers, Black Japanned.

Size of opening.	Register.	Register face.	Floor border.	Size of opening.	Register.	Register face.	Floor border.
4½ x 6½	1.40	0.55	1.15	10 x 30	19.50	8.00	8.00
4 x 8	1.50	0.60	1.15	11 x 17	6.30	3.70	3.70
4 x 10	1.55	0.75	1.15	11 x 18	6.75	3.95	3.95
4 x 12	1.80	0.95	1.35	11 x 20	8.95	4.45	4.45
4 x 13	2.50	1.10	1.75	12 x 12	4.00	2.70	2.70
4 x 15	3.00	1.20	1.90	12 x 14	4.35	2.80	2.80
4 x 18	4.00	1.30	2.75	12 x 15	4.50	2.90	2.90
4 x 21	5.00	2.25	3.15	12 x 16	5.60	3.50	3.50
4 x 24	6.00	2.75	3.75	12 x 17	6.35	3.80	3.80
5 x 8	1.55	0.90	1.15	12 x 18	6.80	3.90	3.90
5 x 9	1.55	1.00	1.20	12 x 19	7.50	4.00	4.00
5 x 10	1.60	1.05	1.20	12 x 20	9.00	4.50	4.50
5 x 11	1.75	1.10	1.30	12 x 24	12.25	5.50	5.50
5 x 12	1.80	1.20	1.40	12 x 30	20.00	8.20	8.20
5 x 13	2.60	1.35	1.80	12 x 32	24.50	9.75	9.75
5 x 14	2.80	1.50	1.90	12 x 36	26.75	10.25	10.25
5 x 15	3.60	1.65	2.00	12 x 40	35.00	15.50	15.50
5 x 16	3.90	1.80	2.60	14 x 14	7.90	4.05	4.05
5 x 17	4.20	2.00	2.70	14 x 15	8.25	4.20	4.20
5 x 18	5.25	2.10	3.20	14 x 16	8.50	4.30	4.30
6 x 6	1.50	0.90	1.15	14 x 18	9.00	4.50	4.50
6 x 8	1.55	1.00	1.15	14 x 20	9.50	4.80	4.80
6 x 9	1.60	1.05	1.20	14 x 22	10.50	5.00	5.00
6 x 10	1.60	1.05	1.20	14 x 24	14.90	6.90	6.90
6 x 12	1.85	1.25	1.45	14 x 48	46.00	20.00	20.00
6 x 14	2.85	1.65	1.90	15 x 15	10.00	4.90	4.90
6 x 16	4.00	2.00	2.70	15 x 21	12.50	6.20	6.20
6 x 18	5.20	2.25	3.25	15 x 25	17.50	7.10	7.10
6 x 20	6.00	2.50	3.50	15 x 30	27.50	10.75	10.75
6 x 22	7.00	3.00	3.95	15 x 34	31.75	13.75	13.75
6 x 24	8.00	3.70	4.50	16 x 16	11.00	5.10	5.10
6 x 28	9.50	4.25	5.40	16 x 18	12.00	5.30	5.30
6 x 30	11.50	4.75	6.00	16 x 20	12.35	6.10	6.10
6 x 32	13.00	5.25	6.50	16 x 22	14.75	6.70	6.70
7 x 7	1.55	1.00	1.20	16 x 24	15.00	7.00	7.00
7 x 10	1.65	1.10	1.25	16 x 28	24.60	10.00	10.00
7 x 12	1.90	1.25	1.50	16 x 30	27.90	11.00	11.00
7 x 14	2.95	1.90	1.90	16 x 32	31.00	13.10	13.10
7 x 15	3.75	2.55	2.25	16 x 36	36.00	16.00	16.00
8 x 8	1.60	1.05	1.20	18 x 18	18.50	7.20	7.20
8 x 10	1.65	1.10	1.25	18 x 20	19.50	7.60	7.60
8 x 12	1.90	1.30	1.50	18 x 21	20.50	7.75	7.75
8 x 13	2.75	1.85	1.85	18 x 24	21.50	8.35	8.35
8 x 14	3.00	2.00	2.00	18 x 27	27.50	10.75	10.75
8 x 15	3.80	2.60	2.60	18 x 30	31.25	13.25	13.25
8 x 16	4.50	2.70	2.70	18 x 36	38.00	17.25	17.25
8 x 18	6.60	3.50	3.50	20 x 20	19.75	8.00	8.00
8 x 20	8.70	3.90	3.90	20 x 22	21.60	8.40	8.40
8 x 21	9.00	4.00	4.00	20 x 24	22.00	8.60	8.60
8 x 24	11.25	4.70	4.70	20 x 26	23.50	9.50	9.50
8 x 27	13.60	5.40	5.40	20 x 28	28.90	11.50	11.50
8 x 30	14.70	6.30	6.30	20 x 30	33.50	13.50	13.50
9 x 9	2.00	1.40	1.60	20 x 32	37.50	17.10	17.10
9 x 12	2.10	1.45	1.65	20 x 36	43.00	18.50	18.50
9 x 13	2.95	2.00	2.00	21 x 21	24.50	9.75	9.75
9 x 14	3.10	2.15	2.15	21 x 25	28.00	11.10	11.10
9 x 15	3.95	2.65	2.65	21 x 29	29.00	11.60	11.60
9 x 16	4.70	2.70	2.70	21 x 33	42.00	17.90	17.90
9 x 17	5.95	3.25	3.25	21 x 37	49.00	21.50	21.50
9 x 18	6.65	3.60	3.30	21 x 39	54.00	24.90	24.90
9 x 19	7.40	3.95	3.95	22 x 22	28.50	11.40	11.40
9 x 20	8.75	4.30	4.30	22 x 24	29.50	11.80	11.80
9 x 22	10.35	4.50	4.50	22 x 26	31.00	13.10	13.10
9 x 24	12.00	5.30	5.30	22 x 28	33.90	13.90	13.90
9 x 25	14.25	6.00	6.00	22 x 30	36.00	16.00	16.00
9 x 26	15.25	6.35	6.25	22 x 32	42.00	17.50	17.50
9 x 28	16.35	6.80	6.50	22 x 36	47.50	20.50	20.50
9 x 30	17.50	7.10	7.10	22 x 38	52.00	22.50	22.50
10 x 10	2.35	1.65	1.70	22 x 42	64.00	27.00	27.00
10 x 12	2.40	1.70	1.75	24 x 24	30.00	12.00	12.00
10 x 14	3.15	2.20	2.20	24 x 27	33.95	14.00	14.00
10 x 16	4.85	2.95	2.95	24 x 30	38.00	17.25	17.25
10 x 18	6.70	3.70	3.70	24 x 32	42.50	18.00	18.00
10 x 20	8.90	4.35	4.35	24 x 36	50.00	22.00	22.00
10 x 22	10.40	4.90	4.90	24 x 45	67.50	28.50	28.50
10 x 24	12.15	5.35	5.35	27 x 27	37.25	17.00	17.00

27 x 38	56.00	25.00	25.00
28 x 28	44.00	19.00	19.00
28 x 30	48.50	21.00	21.00
28 x 32	53.00	24.50	24.50
28 x 36	64.00	27.00	27.00
30 x 30	49.00	21.50	21.50
30 x 36	67.50	28.50	28.50
30 x 42	77.50	33.00	29.00
30 x 48	95.00	39.00	31.00
36 x 36	80.00	35.00	29.50
36 x 40	105.00	44.00	32.10
36 x 42	112.00	46.00	34.00
36 x 48	132.00	54.00	40.00
38 x 38	100.00	43.50	32.00
38 x 40	112.00	46.00	34.00
38 x 42	120.00	50.00	36.00

Registers, White Japanned.

Size of opening.	Register.	Wall frames. Register face.	2 in. deep.	4 in. deep.
4½ x 6½	1.70	0.85	0.80	1.30
4 x 8	1.80	0.90	0.90	1.40
4 x 10	1.90	1.10	1.00	1.70
4 x 12	2.20	1.35	1.20	1.90
4 x 13	3.00	1.50	1.25	2.00
4 x 15	3.60	1.80	1.40	2.30
4 x 18	4.65	1.95	1.60	2.60
4 x 21	6.00	3.25	1.80	3.00
4 x 24	7.00	3.75	2.00	2.40
5 x 8	1.90	1.25	0.90	1.60
5 x 9	1.90	1.30	1.00	1.70
5 x 10	1.95	1.40	1.10	1.80
5 x 11	2.15	1.50	1.20	1.90
5 x 12	2.25	1.60	1.25	2.00
5 x 13	3.10	1.85	1.30	2.20
5 x 14	3.40	2.00	1.40	2.30
5 x 15	4.30	2.35	1.45	2.40
5 x 16	4.65	2.55	1.50	2.50
5 x 17	5.00	2.80	1.60	2.60
5 x 18	6.20	3.15	1.70	2.80
6 x 6	1.80	1.20	0.90	1.40
6 x 8	1.85	1.30	1.00	1.70
6 x 9	1.90	1.35	1.10	1.80
6 x 10	1.95	1.40	1.20	1.90
6 x 12	2.25	1.60	1.30	2.20
6 x 14	3.45	2.10	1.40	2.40
6 x 16	4.80	2.80	1.60	2.70
6 x 18	6.25	3.30	1.70	2.90
6 x 20	7.20	3.70	1.90	3.10
6 x 22	8.40	4.40	2.00	3.40
6 x 24	9.60	5.30	2.20	3.60
6 x 28	11.00	5.75	2.50	4.10
6 x 30	13.00	6.25	2.60	4.30
6 x 32	14.25	6.50	2.70	4.60
7 x 7	1.90	1.35	1.00	1.70
7 x 10	2.00	1.40	1.20	2.10
7 x 12	2.30	1.65	1.30	2.30
7 x 14	3.55	2.50	1.50	2.50
7 x 15	4.50	3.30	1.55	2.60
8 x 8	1.95	1.40	1.10	1.90
8 x 10	2.00	1.45	1.30	2.20
8 x 12	2.30	1.70	1.40	2.40
8 x 13	3.30	2.40	1.50	2.50
8 x 14	3.60	2.60	1.55	2.60
8 x 15	4.55	3.35	1.60	2.80
8 x 16	5.40	3.60	1.70	2.90
8 x 18	7.90	4.80	1.80	3.10
8 x 20	10.40	5.60	1.90	3.40
8 x 21	10.80	5.80	2.00	3.50
8 x 24	12.40	6.00	2.30	3.80
8 x 27	15.00	6.80	2.50	4.20
8 x 30	16.00	7.90	2.70	4.60
9 x 9	2.40	1.80	1.30	2.20
9 x 12	2.55	1.90	1.50	2.60
9 x 13	3.55	2.55	1.60	2.70
9 x 14	3.70	2.75	1.70	2.80
9 x 15	4.75	3.45	1.75	2.90
9 x 16	5.65	3.65	1.80	3.10
9 x 17	7.15	4.65	1.90	3.20
9 x 18	8.00	4.95	2.00	3.30
9 x 19	8.90	5.40	2.05	3.40
9 x 20	10.25	5.65	2.10	3.50
9 x 22	11.50	6.15	2.20	3.80
9 x 24	13.20	6.50	2.40	4.00
9 x 25	15.65	7.40	2.50	4.20
9 x 26	16.75	7.85	2.55	4.30
9 x 28	18.00	8.45	2.70	4.50
9 x 30	19.25	8.85	2.80	4.80
10 x 10	2.85	2.15	1.50	2.50
10 x 12	2.90	2.20	1.70	2.80
10 x 14	3.80	2.85	1.80	3.00
10 x 16	5.85	3.95	2.00	3.30
10 x 18	8.05	5.05	2.10	3.50
10 x 20	10.50	5.75	2.30	3.80
10 x 22	12.00	6.25	2.50	4.20
10 x 24	13.40	6.60	2.60	4.30
10 x 30	21.45	9.95	3.00	5.00
11 x 17	7.55	4.95	2.30	3.60
11 x 18	8.10	5.30	2.35	3.20
11 x 20	10.75	6.25	2.50	4.00
12 x 12	4.80	3.50	2.00	3.10
12 x 14	5.25	3.65	2.20	3.40
12 x 15	5.40	3.80	2.30	3.50
12 x 16	6.70	4.60	2.40	3.60
12 x 17	7.60	5.05	2.50	3.80
12 x 18	8.15	5.25	2.60	3.90
12 x 19	9.00	5.50	2.65	4.00
12 x 20	10.80	6.30	2.70	4.20
12 x 24	13.50	6.75	3.00	4.70
12 x 30	22.00	10.20	3.50	5.50
12 x 32	26.95	12.20	3.70	5.70
12 x 36	29.40	12.90	4.00	6.30
12 x 40	38.50	19.00	4.70	7.20
14 x 14	9.45	5.60	2.60	3.80
14 x 15	9.90	5.85	2.70	3.90
14 x 16	10.20	6.00	2.80	4.10
14 x 18	10.80	6.30	3.00	4.30
14 x 20	11.25	6.40	3.10	4.60
14 x 22	12.00	6.50	3.30	4.80
14 x 24	16.40	8.40	...	...
14 x 48	50.60	24.60	...	...
15 x 15	11.25	6.15	...	...
15 x 21	13.75	7.45	...	...
15 x 25	19.25	8.65	...	5.60
15 x 30	30.25	13.20	...	...
15 x 34	34.90	16.90	...	...
16 x 16	12.20	6.20	...	4.40
16 x 18	13.20	6.50	...	4.70
16 x 20	13.60	7.35	...	5.00
16 x 22	16.20	8.15	...	5.30
16 x 24	16.50	8.50	...	5.50
16 x 28	27.05	12.45	...	6.10
16 x 30	30.70	13.80	...	...
16 x 32	34.10	16.20	...	6.70
16 x 36	39.60	19.60	...	...
18 x 18	20.25	9.05	...	5.20
18 x 20	21.45	9.55	...	5.50
18 x 21	22.55	9.80	...	5.60
18 x 24	23.65	10.50	...	6.00
18 x 27	30.25	13.50	...	6.40
18 x 30	34.35	16.35	...	6.80
18 x 36	41.80	21.05	...	7.80
20 x 20	21.75	10.00	...	5.90
20 x 22	23.35	10.55	...	6.30
20 x 24	24.20	10.80	...	6.60
20 x 26	25.85	11.85	...	6.90
20 x 28	31.80	14.40	...	7.10
20 x 30	36.85	16.85	...	7.50
20 x 32	41.25	20.85	...	7.70
20 x 36	47.30	22.80	...	8.50
21 x 21	26.95	12.20	...	...
21 x 25	30.80	13.90	...	...
21 x 29	31.90	14.50	...	7.70
21 x 33	46.20	22.10	...	...
21 x 37	53.90	26.40	...	8.90
21 x 39	59.40	30.30	...	...
22 x 22	31.35	14.25	...	...
22 x 24	32.45	14.75	...	...
22 x 26	34.10	16.20	...	...
22 x 28	37.30	17.30	...	...
22 x 30	39.60	19.60	...	...
22 x 32	46.20	21.70	...	...
22 x 36	52.25	25.25	...	...
22 x 38	57.20	27.70	...	...
22 x 42	70.40	33.40	...	...
24 x 24	33.00	15.00	...	7.20
24 x 27	37.35	17.40	...	7.80
24 x 30	41.80	21.05	...	8.10
24 x 32	46.75	22.25	...	8.60
24 x 36	55.00	27.00	...	9.10
24 x 45	74.25	35.25	...	10.50
27 x 27	40.95	20.70	...	8.10
27 x 38	61.60	30.60	...	9.90
28 x 28	48.40	32.40	...	...
28 x 30	53.35	25.85	...	...
28 x 32	58.30	29.80	...	...
28 x 36	70.40	33.40	...	...
30 x 30	53.90	26.40	...	9.00
30 x 36	74.25	35.25	...	10.00
30 x 42	85.25	40.75	...	...
30 x 48	104.50	48.50	...	...
36 x 36	88.00	43.00	...	11.00
36 x 40	115.50	54.50	...	...
36 x 42	123.20	57.20	...	...
36 x 48	145.20	67.20	...	...
38 x 38	110.00	53.50	...	...
38 x 40	123.20	57.20	...	...
38 x 42	132.00	62.00	...	...

Cotton Cord, Twine, &c.—Since the development of high prices for Cotton, advances have been made on Cotton Cord, Lines, Rope, Twine, &c. The price on the raw material has now reached such a point that some of the mills are closing down and Cotton Goods are becoming scarce, with substantially higher prices, which amount, in a general way, on the goods named, from 10 to 20 per cent. Sash Cord feels this influence in a marked degree.

Paris Green.—No improvement is noted by manufacturers in demand, owing to unfavorable weather conditions. In absence of business former quotations fairly represent the market:

Less than 1 ton.	Per lb.
Arsenic kegs or casks	13½c.
Kegs, 100 to 175 pounds	14c.
Kits, 14, 28, 56 pounds	15c.
Paper boxes, 2 to 5 pounds	15c.
Paper boxes, 1 pound	15½c.
Paper boxes, ½ pound	16c.
Paper boxes, ¼ pound	17c.

One to 5 tons, 1 cent per pound less; 5 tons and over, 1½ cents per pound less.

Cordage.—Rope continues in excellent demand and conditions, on the whole, are considered more satisfactory than for some time. Quotations, on the basis of 7-16 inch and larger, are as follows: Sisal, according to quality, 9 to 10 cents; Manila, on the same basis, 12 cents per pound. A rebate of ¼ cent per pound is allowed on large lots.

Glass.—The Jobbers' Association have decided not to purchase the 300,000 boxes of Glass, or any portion of the same, at present. This decision has been reached after nearly three weeks of agitation and discussion, during which time many meetings have been held. For the same length of time the three Glass combines have been trying to formulate some plan of united action. Thus far they have not succeeded. Three or four years ago the American Window Glass Company controlled about 90 per cent. of the productive capacity of the country. Now it is estimated that they control in the neighborhood of 30 per cent, that the other two combines represent about 40 per cent., and the outside factories about 30 per cent. It is intimated that because the control of the market is not centralized, the Jobbers' Association have felt it possible for them to take a position in regard to buying Glass, when an allotment was proposed by the manufacturers, that they have not been able to do before. Thus the matter rests at present. The Jobbers' Association's quotations are as follows: In small lots, 90 and 5 per cent. discount for the first three brackets, and 90 and 15 per cent. discount for all sizes above, either single or double strength.

Oils.—*Linseed Oil.*—On the 19th inst. City Raw was reduced to 43 cents in lots of less than 5 barrels, and to 42 cents per gallon in lots of 5 barrels or more. Out of town brands are selling from 38 to 39 cents, according to quantity. Further reductions in price are not unlooked for by the trade. Seed has dropped in price to below $1 a bushel, which is the lowest point it has reached in some years. Demand is only moderate for Oil.

Spirits Turpentine.—Demand is light, with quotations the same as for the past few days, which, according to quantity, are as follows: Oil barrels, 50 to 50½ cents; machine made barrels, 50½ to 51 cents per gallon.

ANOTHER TRADE EXCURSION.

THE Hardware and Implement dealers of North Dakota are planning another excursion to the Southwest next winter. As yet nothing has been definitely decided upon except that Old Mexico will be the objective point of the excursion. The annual meetings of the Hardware, Implement and Grocers' associations will be held from six to eight weeks earlier than usual next winter, or soon after January 1, and, as previously arranged, they will all be held simultaneously in Grand Forks. As now planned the excursion will start from that city immediately after the close of the meetings. The excursion of last winter through the South met with such universal satisfaction that it has been the wish of those participating in it to have another one planned for the coming year. In all probability the next excursion will take in most of the prominent cities of the Southwest, going from St. Paul to Omaha, Kansas City, Fort Worth, Galveston, and then down into Old Mexico, returning by way of St. Louis and Chicago.

G. C. RICKLY, secretary of the King & Hamilton Company, Ottawa, Ill., has purchased a gray iron foundry at Morris, Ill., and will conduct it under the name of the Morris Foundry & Machine Company. Iron and Brass Castings, Hand Corn Shellers and Hardware Specialties will be manufactured. The business will be managed by Mr. Rickly's son, Roy C. Rickly, who has severed his connection with the King & Hamilton Company.

THE SARATOGA CONVENTIONS.

PREPARATIONS are rapidly being completed for the conventions of the Southern Hardware Jobbers' Association and the American Hardware Manufacturers' Association, at Saratoga Springs, N. Y., on July 14, 15, 16 and 17. The official programme of the jobbers will soon be issued, and that of the manufacturers will follow at a later date. That the jobbers have laid out a large and comprehensive programme for the serious side of the convention is evident from the following list of topics which will be discussed, most of them in joint session with the manufacturers, and a few at executive session.

"What Should Be the Policy of the Manufacturers in the Distribution of Their Products?"

"Shall a Manufacturer Sell Direct, or Through Agents or Brokers, to a Dealer Whose Name Has Been Dropped from the List of Syndicate Buyers as Not Being a Legitimate Jobber?"

"Who Has the Right to Route Shipments—the Buyer or the Seller?"

"The Twentieth Century Distributer: His Relations to the Jobber and Manufacturer."

"Advantages and Disadvantages of Net Prices and Grouped Discounts as Against Uniform Lists and Discounts."

"Salesmanship—Some Definitions Quoted and Thoughts Expressed by an Office Man."

"Local Associations."

"The Hardware Jobber—His Past, His Present and His Future."

"Advantages and Disadvantages of Maximum Contracts."

"The Knight of the Grip."

"Importance of Uniformity in the Sizes, Weights and Measures of All Goods Offered to the Trade."

"Shall Manufacturers Restrict Selling Prices?"

The Reception Committee, under the efficient chairmanship of Irby Bennett, and comprising nearly 70 gentlemen well known as representatives of manufacturing interests, are making ample provision for the entertainment of their jobbing friends, and it is hoped that the social end of the convention will be as pleasant as the business end is profitable. The most important numbers on the entertainment programme are a reception and house warming on Tuesday evening, a mammoth carriage drive on Wednesday afternoon, smoker and dance on Wednesday evening, musicale on Thursday evening, and banquet on Friday night. This does not exhaust the list, however, so that it will be seen that the social side of the meeting will be quite as attractive, if not more so than the business side. This fact will be much appreciated by the ladies, who are, we understand, coming to the convention in large numbers, owing doubtless to the great reputation which Saratoga enjoys among the pleasure resorts of the country.

The railroad rate will probably be the usual fare and a third, though efforts are making to secure the round trip for the price of a single fare. From the indications at the present time it is estimated by persons in touch with the arrangements that the total attendance at the two conventions will not be very far short of 1000.

The full outline of the manufacturers' programme has not yet been determined. Arrangement has, however, been made for a powerful address on the "Boycott; How It Can Be Destroyed," by Daniel Davenport, a prominent attorney of Bridgeport, Conn. It has also been determined that J. C. Birge of the St. Louis Shovel Company will make the address of welcome to the jobbers at the manufacturers' joint session, on Wednesday, July 15.

THE directors of the Southington Cutlery Company, Southington, Conn., have elected C. E. Jennings a director of the company to succeed the late Charles D. Barnes, who was also the president of the concern. Mr. Jennings is the head of C. E. Jennings & Co., New York, as well as the Jennings & Griffin Mfg. Company, Yalesville, Conn., where they manufacture Mechanics' Tools as they do at other works in Middletown, N. Y. Charles H. Clark of Clark Bros. Bolt Company, Milldale, Conn., manufacturers of Bolts, Nuts and Rivets, was elected acting president and will hold the position until the annual meeting in July, when the position will be permanently filled.

CANVASSING EXPORT MARKETS.

JOSEPH H. CHERRY, manager of exports for Sargent & CO., New Haven, Conn., and New York, manufacturers of large and important lines of Builders' and General Hardware, sailed June 19 for Europe on the "Cedric." He will visit the trade of London and Paris as well as other important Continental trade centers, going thence to South Africa and Australia, it being his intention to call at other leading ports and cities in the Orient located in China, Japan, the Philippines and Hawaiian Islands on the way home, via San Francisco, taking one or two years for the trip, according to trade developments. Mr. Cherry started on a similar trip over practically the same route about three years ago, being away from New York 18 months. He takes with him now as then a comprehensive line of samples, which is the best method of showing American manufactures. The leading American houses are more and more recognizing the necessity for introducing their products in the chief foreign markets, through the medium of their own trained representatives abundantly qualified not only to show samples and solicit orders, but talk the merits of the goods specifically and convincingly as specialists. The best warrant for this, where the line of manufactures warrants the expense, is in the marked increase of exports of manufactures of iron, steel and other metals from the United States, as shown by official Treasury statistics, even in the face of an unparalleled home demand at abnormally high prices.

DEATH OF L. H. AUERBACHER.

LOUIS H. AUERBACHER, whom readers of *The Iron Age* will recall as a well-known traveling salesman for many years with Hermann Boker & Co., died at his home, in New York, Saturday, June 6. Mr. Auerbacher was born in Zweibrucken, Bavaria, July 11, 1843, coming to this country at the time of the Revolution of 1848 in Germany. His first employment as a boy was with the house of Demmler Bros., Pittsburgh, when about 14 years old, remaining with them until the breaking out of the Civil War in 1861, when he enlisted in the Sixteenth Pennsylvania Regiment and served throughout the conflict. He married in 1866, and about that time began traveling for Hermann Boker & Co. He remained with them, covering the principal cities of the United States, until about 1886-87, when wishing to be in a business that would permit him to be more at home he purchased Mr. Cassebeer's interest in the house of Cassebeer & Reed, New York, who dealt largely in fine Mechanics' Tools, Hardware and Supplies, the firm then becoming Reed & Auerbacher, as they have ever since remained. With the death of Mr. Reed in 1897, Mr. Auerbacher became sole proprietor, but continued the business under the same style. Mr. Auerbacher, although of an athletic inclination, has been afflicted with asthmatic conditions ever since the war, this weakness finally developing into pneumonia and ultimately causing his death. He was of an exceedingly cheerful and genial disposition, with a kind word for all, and scrupuously honest and fair in his dealings. When he severed his connection with Boker & Co. his employers gave him a handsome watch as a testimonial, and the employees of the house gave him a fine chain to accompany it. Mr. Auerbacher is survived by a widow, two sons and three daughters, the sons continuing the business.

DEATH OF THOMAS CHALMERS.

THOMAS CHALMERS died at his home, in Oceanic, N. J., June 15, in his seventieth year, having retired from the Hardware business a dozen or more years ago. Mr. Chalmers was the New York representative and buyer of what in the 40 years of his connection with the house were variously known as Slark, Stauffer & Co., Stauffer, Kent & Co., Stauffer, Macready & Co., and now as Stauffer, Eshleman & Co., New Orleans. For 20 years Mr. Chalmers was a member of the Board of Managers of the New York Infant Asylum, and was chairman of the Adoption Committee until 1901.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS *for catalogues, price-lists, quotations, &c., have been received from the following houses:*

FROM LACKAWANNA SUPPLY COMPANY, Scranton, Pa., who several months since embarked in the Mill and Factory Supply business.

FROM SOUR LAKE HARDWARE COMPANY, Sour Lake, Texas. Guy M. Bryan of the Bryan Hardware Company, Galveston, Texas, has organized this company with a capital of $25,000. Mr. Bryan is president of the company and will divide his time between Sour Lake and Galveston, the business of the Bryan Company continuing as heretofore. The new company express a special desire for catalogues relative to Builders' Hardware and Tools, Fire Arms and Ammunition, and Oil Well Supplies.

FROM A. R. CLAY & Co., Moody, Texas, who are adding a plumbing and tin shop to their Hardware and Agricultural Implement business, and desire printed matter relating especially to that department.

FROM E. F. PUMPHREY, who has lately purchased the Hardware, Stove, Tinware, Agricultural Implement, Paint and Oil and Sporting Goods business of Wolverton & Co. in Derby Iowa.

FROM CHAS. L. WHITE, who has just opened a store at Westville, Ind., handling Shelf and Heavy Hardware, Stoves and Tinware, Paints and Oils and Harness.

FROM PLAINVIEW HARDWARE & IMPLEMENT COMPANY, Plainview, Texas., who have incorporated with a capital of $10,000, their line embracing General Hardware and Agricultural Implements, Wind Mills and Vehicles.

FROM W. F. HAFNER, who is about to open a store at Elyria, Ohio. Mr. Hafner has been connected with Hubert Day's store for the past 18 years, and will handle Shelf Hardware, Tinware, Paints and Oils, Glass, &c.

FROM C. B. JOHNSTON, Hardware merchant, Lebanon, Ky., who has closed out his old stock and opened up anew. He carries Staple and Fancy Hardware, Tin, Japanned and Enameled Ware, &c., a specialty being made of Mill Supplies and Water and Steam Fittings.

FROM W. H. TOOLEY & Co., Walker's Building, 49 Whitechapel, Liverpool, England, who are opening up a department for the sale of American specialties and are also ready to act as agents. They will be pleased to hear from American manufacturers with catalogues and quotations.

THE CEDAR RAPIDS PUMP COMPANY'S CATALOGUE.

THE CEDAR RAPIDS PUMP COMPANY, Cedar Rapids, Iowa, have issued an illustrated catalogue and price-list E, relating to their line of Wood and Iron Pumps, Tanks, Tubular Well Goods, Water and Steam Supply Goods. The catalogue contains 298 pages, in addition to which is an alphabetically arranged index of five pages. The manufacturers remark that their line of Iron Pumps has been greatly improved during the past year. The company have enlarged their facilities and refer to the fact that they are able to execute all orders with a higher degree of efficiency than ever before.

THE Executive Committee having in charge the arrangements for the annual picnic of the Chicago Retail Hardware Dealers' Association at a meeting held June 16 passed a resolution requesting that all retail dealers at Chicago close their stores on the day of the picnic, July 15.

PRICE-LISTS, CIRCULARS, &c.

THE TURNER BRASS WORKS, 48 North Franklin street, Chicago.: New 56-page catalogue of Gasoline Torches and other Gasoline Appliances. The catalogue is fully illustrated and contains several styles of Double Jet Torches and other appliances recently placed on the market, including the Turner Gasoline Bunsen Light and Manyscope, Franklin Torch, Crucible Furnace Outfits, Pressure Indicating Pump and several new styles of Double Jet Torches which are shown in their catalogue for the first time.

THE GEO. L. SQUIER MFG. COMPANY, Buffalo, N. Y.: Illustrated price-list describing the complete line of the Squier Tortilla Mills and Corn Shellers.

THE TUTTLE & BAILEY MFG. COMPANY, 83 Beekman street, New York: Catalogue for 1903, giving a revised price-list which will go into effect July 1. A special feature of the price-list is the arrangement of illustrations showing the patterns of goods in direct connection with the prices given on them. Among the special goods shown is a new Side Wall Register, to be used in a baseboard and adapted to shallow flues and thin partitions. The company are also manufacturers of all styles of Bronze Tablets for public buildings and church memorials.

THE FERROSTEEL COMPANY, Cleveland, Ohio: Revised illustrated price-list of Registers, Ventilators, Ceiling Plates, Side Wall Registers, &c. The revised price-list takes effect July 1, 1903.

THE EUGENE DIETZGEN COMPANY, 119-121 West Twenty-third street, New York: Illustrated descriptive price-list of Richter's Drawing Instruments.

THE AVERY STAMPING COMPANY, Cleveland, Ohio: Illustrated folder devoted to Shovels and Spades, including the patented plain back; also Snow and Ash or Furnace Shovels, and Sidewalk Scrapers. The special features of these goods are mentioned and illustrated.

THE TAPLIN MFG. COMPANY, New Britain, Conn., and 155 Chambers street, New York: A compact and convenient pocket folder for the salesman, illustrating and describing Taplin's Dover Pattern, Improved Egg Beaters, Cream Whips and Mixers for families, restaurants, hotels, bakers, &c. The tough paper cover is 4 x 7 inches with three sets of columns for the entire ten sizes for costs, and jobbers' and retailers' prices, to be filled in by the salesman with his own particular prices. Inside the covers are three sheets of varying sizes, large enough to illustrate actual size of every Beater, including the No. 300 Mammoth, 15¾ inches long over all. No prices are printed on the sheets. For foreign trade illustrated slips, envelope size, are printed in German and Spanish with the lengths in figures.

E. C. ATKINS & CO.

E. C. ATKINS & CO., Indianapolis, Ind., have lately purchased the greater part of the property adjoining their plant now occupied by the Parry Mfg. Company. The property includes 200 feet facing the east side of South Illinois street, 200 feet facing the west side and running back 195 feet and four lots, 190 feet deep, facing the east side of Capitol avenue. The Atkins Company now have the entire block, bounded by Capitol, Illinois, South and Garden streets, as well as the frontage named on the east side of Illinois street. Much of the newly acquired ground is covered by substantial brick buildings recently erected and which can be equipped for the manufacture of Saws. Frame structures on the remaining part will be replaced with more substantial buildings. The Parry Company holds a lease with two years yet to run, but it is fast completing buildings on a new site in the western part of the city. The Atkins people have paid about $250,000 for the above property, and a heavy investment for machinery is in prospect. It is also announced that the erection of a crucible steel plant in Indianapolis is contemplated. E. C. Atkins & Co. will, it is stated, be interested in this concern and will be large consumers of its product, and their manufacture of Saws and other tools thus materially facilitated.

THE CHURCH BELL INCIDENT.

WE have received some further letters from the trade on this subject, to which reference was made in our last issue, as well as the one preceding. We are glad to have these expressions, relating as they do to a matter which is of more than ordinary interest, and shall be pleased to hear further from any who desire to submit their views as to the principles and considerations which should govern in the case under discussion. For convenience in appreciating the force of the opinions expressed in the letters we recall the incident and questions relating to it:

The Church Bell.

A retail Hardware merchant receives an inquiry for a Church Bell of given quality and weight, for use in a new church in his town.

The merchant obtains from a jobbing house a quotation on the Bell, adds 10 per cent. profit, and names the price to the Building Committee.

The Building Committee tell him that they are able to do better by purchasing from a catalogue house, who quote them a price substantially the same as the retailer's cost from the jobber.

The merchant takes up the matter with the jobbing house, mentioning the price at which the church can buy the Bell from the catalogue house, and protesting that it is not right that his customer should be able to purchase the Bell as cheaply as he.

The jobbing house reply that they added only a moderate percentage of profit to their cost, the catalogue house having purchased the Bell from the manufacturer at the same price as the manufacturer quoted the jobber.

The result was that the Building Committee bought the Bell from the catalogue house.

Were the Building Committee to blame for buying the Bell from the catalogue house?

Was the retailer right in going to the jobber instead of direct to the manufacturer?

Should the jobber in any way be held responsible for the fact that the Bell was purchased from the catalogue house and not from the Hardware merchant?

Was the manufacturer right in making the catalogue house the same price as the jobber?

Complex Trade Conditions.

From Well-Known Manufacturers of Bells: The Building Committee were entitled to buy where they could buy the cheapest.

The retailer probably went to the jobber, not knowing the manufacturer; as he probably sells a Bell only once in five years he should have considered it an exceptional case where there was no obligation on his part to recognize the jobber if he had access to the maker.

The jobber was perfectly right in figuring to make a small profit, as long as the chance fell to him to secure the order: it was simply one of those opportunities he had to catch a stray order for an unusual thing.

The right of the manufacturer to make a catalogue house the same price as the jobber is one of expediency or policy, and is justified or not by results. The catalogue house and department store have forced recognition from the maker in nearly all lines, for they have developed an output that calls for quantities, and volume is what the factory must have.

It seems to be the jobber and the retailer against the catalogue or department stores, and we believe that both will continue to do business indefinitely. Trade conditions are too complex and the lines are so varied that the question of the survival of the fittest will be so far in the future as to take it out of present practical consideration.

The Jobber in the Way.

From a Western Merchant: The story of the Church Bell as told in *The Iron Age* of June 11 is both interesting and instructive.

Were the Building Committee to blame for buying the Bell from the catalogue house?

Certainly not. It was their plain duty to buy the Bell for the lowest price they could. One wonders that they did not also write to the factory direct, as they would have been justified in doing, and seeing if they could not get a still lower price there. They probably acted up to the best light they had and were content to have the two prices to compare with each other, and bought, as was their duty, where they could buy at the lower price.

Was the retailer right in going to the jobber instead of direct to the manufacturer?

Of course he had a "right" to go where he pleased, but the sequel to the story shows he was very unwise, and lost the sale by bringing the jobber between him and the manufacturer. What argument could he have possibly found to lead him to do this? He could not have said to himself: "Jobbers carry a large stock of Church Bells on hand all the time and must buy them in large quantities, and will probably sell me one at a lower price than the manufacturer will." He must have known better than this, as to jobbers carrying any stock of Church Bells, and might easily have said that it would be no more work to the factory to ship a Bell to him on his direct order than to ship it on the jobber's order.

Should the jobber be held responsible for the outcome of the transaction?

To a good extent, yes. When the retailer took up the matter with the jobber, showing him what he had to contend against, a wise jobber would have realized that this was a case where his interests and the retailer's were one and the same; that the loss of the sale of that Bell might be far reaching to the retailer, and as the retailer was his customer would thus be bad for him. He should have told the retailer

TO MEET THE PRICE OF THE CATALOGUE HOUSE

and the two would divide the small margin there was in it, or, what would have been even more beneficial to both, advise the retailer to cut the catalogue house's price a little and then give him the Bell at the exact factory cost. Is this asking too much of any jobber? It has been done many times in business for even less cause, and under these circumstances was the one thing to do.

Was the manufacturer right in making the catalogue house the same price as the jobber?

That depends entirely upon which was buying the greater number of Bells. The Bell business is probably one that is unlike most others. No jobber or retailer would stock up on Church Bells. They order one when some customer wants it. The catalogue houses do the same, and the chances are that some of these houses sell a dozen Bells to one sold through any jobber. Probably the factory has one price for Bells, or at most two prices—one for a church committee (who are not always the most desirable customers to sell to) and a lower one to a reputable dealer in good credit. As was said above, the probabilities are the retail dealer could have secured this price, as both the jobber and the catalogue house did, and would have then been on firm ground to meet competition.

FOR NOT DOING THIS

he must blame only himself, and he and his fellows take a lesson from it for the future.

The story teaches what the writer has said before in these columns—that the jobber to-day stands between the retailer and the manufacturer, taking a toll that is just high enough to build up the catalogue house at the expense of the retailer. The retailers who are least afraid of competition to-day are those who buy direct from manufacturers.

A Question of Business Policy.

From a Southern Manufacturer: No, we do not think "the committee were to blame for buying the Bell from the catalogue house."

"Was the retailer right in going to the jobber instead of to the manufacturer?" This is a question on which there seems to be a great difference of opinion, and it involves a question of business judgment that must be decided for itself by the individual manufacturer and retailer. We believe it is more economical for the retailer to buy from the jobber, for, were the retailer to go to the manufacturer for each individual article required, even for the most limited stock it would require one man to look after nothing but the buying, and, we believe, the average retailer is more than compensated for the profit which he pays the jobber by the convenience in buying his entire stock possibly from half a dozen houses.

The jobber should not be held responsible for the fact

that the Bell was purchased from a catalogue house and not from a Hardware merchant.

"Was the manufacturer right in making the catalogue house the same price as the jobber?" This, like your second question, involves a question of business policy that each manufacturer must decide as he sees it to his own business interests. Personally, we prefer dealing with the jobbing trade; this has been our policy for the past 15 years, and we can see no good reason for changing it.

The Jobber Has Troubles Enough.

From a Merchant in New Jersey.—The incident mentioned is no doubt a very common one and it also seems to me that it is a real evil of modern business methods, this scramble to do business without regard to how honorable the methods may be. What are we going to do about it? That is the question. In one way the Building Committee were not to blame for buying the Bell as cheaply as they could; from every standpoint of ordinary honor and business policy they were wrong in taking their business away from their own town, from which they derive their support. Unfortunately in this respect we are compelled from our own experience to admit that the average business committee who run church affairs have less regard for honor than people who do business with no religious sentiment or profession mixed therewith.

2. The retailer probably erred in going to the jobber instead of the manufacturer; as, in the case mentioned, after stating the circumstances to the manufacturer he would very likely have given him just as good a price as he would the jobber or catalogue house.

3. Why should the jobber be blamed in any way for this transaction? He lost the order as well as the retailer, and no doubt has troubles enough of his own without being compelled to listen to unjust complaints for conditions over which he does not seem to have any control. It seems to me the one way for the jobber to look at these conditions is that it is an illustration of a growing sentiment in the minds of the public in general, and direct consumer in particular, to get as close as possible to the source of production. Of course, it would be difficult for many retailers to do without the jobber entirely; but the fact remains that with catalogue house competition and competition from a great many jobbing houses who sell to the retailers' customers on every possible opportunity, the retailer must, if only for reasons of self preservation, also get as close to the original production of an article as he possibly can.

4. In my opinion it is not good business policy for any manufacturer to sell to a catalogue house. Of course, we cannot prevent the existence of catalogue houses, but the "hog" policy they pursue could be curtailed by the manufacturers themselves if they were not so short sighted. The interests of any manufacturer in my estimation are safer in the hands of either the jobber or retailer along old lines than they are in the hands of any catalogue house. Of course I do not pretend to say as to whether concerted action of any sort might keep the catalogue houses within bounds, but it certainly does not seem that the social fabric can be successfully maintained without the retail store.

Of course, there is hardly an end to what might be said on this subject, and no doubt every retailer is charged to the point of bursting with his own ideas of this condition. "In a multitude of counselors there is safety," and it may be that out of the discussion that is continually going on in the various trade journals of the country some condition may be evolved which will make the situation possibly more bearable, if not entirely just to the retailer.

Manufacturers' Relations to Catalogue Houses.

From a Merchant in Maryland: The loss of the sale of the Church Bell by the legitimate retail Hardware merchant illustrates very conclusively the hurtful effect of the manufacturers selling their product to the department stores or the catalogue houses at the same price and often lower than they sell to the jobbers. Such preferential advantage to the catalogue houses who deal directly with the consuming trade simply robs the retail Hardwareman of the trade that should come to his support. It not only works an injury to the retail merchant, but also to the jobber, whom the retail merchant would buy from if the manufacturer did not come in this indirect way and sell through the catalogue houses to the consumer as low as the retail merchant buys at. I think the manufacturers are to blame, and, if they persist in it, I do not think it necessary for two branches of business to suffer; therefore, it looks as though the jobber is doomed.

This certainly is a very pertinent question and very important to us jobbers. To meet the case fairly with all concerned, the manufacturer certainly is better off by having the jobber to represent him and keep a supply of his product on hand to fill orders from the retail merchants promptly, which will be a means also of supplying the demands from the consumer promptly. By this method it will be "live and let live." The department stores and catalogue houses are doing widespread injury both to the jobber and the retailer. We come in contact with these catalogue prices every day, particularly from a Chicago concern who have printed prices of every imaginable thing in their catalogue, with prices guaranteed to hold good for six months. Now, to enable them to guarantee the prices for six months the manufacturer certainly must show them preference in guaranteeing prices over the jobber. It is often the case that these catalogue prices are as low or lower than we buy for at the best prices from manufacturers to jobber. There certainly is something wrong about this system, which works a hardship and inequality both to the jobber and retailer. There certainly should be some drastic legislation on the subject. These catalogue houses, without the expense of agents or salesmen or paying license, come right to our door and literally take all the large cash trade away from us by offering prices so very low that the retailer cannot meet them, as in the case of the Church Bell.

All to Blame.

From a Merchant in New York State: Your "Church Bell" is a hard proposition. First, the building committee did right in buying the bell where they could get it cheapest. Second, the retailer was right in going to the jobber first, but when he learned the catalogue house could undersell him he should have tackled the manufacturer. Third, No; the jobber could not help himself. Fourth, the manufacturer was wrong in naming same price to catalogue house as jobber. The jobber is necessary to the Hardware retailer.

Should Have Sacrificed Their Profit.

From a Hardwareman in Ohio: The root of all evil for jobber, retailer and customer in this case, and in all like it, is the manufacturer who will sell his goods to catalogue houses. The building committee cannot be blamed—they were made a committee for the purpose of buying the bell as cheaply as possible, and had nothing to do but report the offers made them as such. There is no question of quality or kinds. The goods are identically the same. The retailer, it would seem, when he found the facts existing as shown by the jobber, should have gone directly to the maker with a full and fair statement of the case, asking protection for himself, entirely regardless of his jobber, other than to possibly state to him later that he had done this.

The retailer should be blamed in every such case for not taking it up with the maker, and especially if the jobber refuses him aid in the same way. The jobber is responsible, in that he will buy or continue to buy goods of any manufacturer who consents to place reputable goods in the slaughter house of the catalogue man. His only protection for his customer is to insist on protection for himself in every case, and then insist that hereafter this same maker cannot sell both him and the slaughterer of good goods, good wages and the better traveling salesman.

One great object of all jobbers' and retail Hardware, State and local associations is to prevent the making of junk of all classes of goods, and to establish a proper

differential as between the maker, the jobber and the retailer; to prevent goods going into the hands of men who have no regard for cost or selling price.

The church had to have its bell, and did right in accepting its committee's report. The committee could not well do otherwise than in buying the identical goods as cheaply as possible. It was up to the jobber and retailer, and when the jobber cannot help his customer—and he is to blame if he cannot or will not try—then it is time to go ourselves, as retailers, direct to the maker.

We should go further. Every case of this kind is one for your retail association and for the national retail association, and if not as an individual matter, as a principle, should be carried there.

MANUFACTURERS' REPRESENTATION IN SAN FRANCISCO.

DURING the past few years the manufacturers' agency business on the Pacific Coast has increased very largely, and, as indicated below, quite a number of Eastern manufacturers are now represented in this manner to the trade in that important section of the country. Among the agencies established on the coast are the following, all of whom are located in San Francisco:

T. W. ARMSTRONG, 308 Market street.
BERGER, CARTER & Co., 150 and 152 Beale street.
CULIN & STANYAN, 31 Market street.
JOHN D. FRENCH COMPANY, 519 Missouri street.
FRENCH & LINFORTH, 308 Market street.
GEO. F. EBERHARD COMPANY, 12 and 14 Drumm street.
HUGHSON & MERTON, 105 Front street.
E. A. KEITHLEY, Rialto Building.
MCMULLIN & EYRE, 124 Sansome street.
OSGOOD & HOWELL, 132 Market street.
C. P. RUST, 7 Pine street.
EUGENE C. SAUL, 3 California street.
W. H. STANLEY, 109 California street.
T. H. SPEDDY, 23 Davis street.

Among the manufacturing concerns represented by the above houses are the following:

BY T. W. ARMSTRONG: Eberhard Mfg. Company, Cleveland.

BY BERGER, CARTER & Co.: Philadelphia Pneumatic Tool Company, Philadelphia; Champion Rivet Company, Cleveland; Falls Hollow Stay Bolt Company, Cuyahoga Falls, Ohio; Walter MacLeod & Co., Cincinnati; E. E. Hanna, Screen Shakers, Chicago. Daniel F. Trench & Co., Chicago; H. G. Kotten, New York City.

BY CULIN & STANYAN: A. Y. McDonald & Morrison Mfg. Company, Dubuque, Iowa; Hollands Mfg. Company, Erie, Pa.; H. Belfield & Co., Philadelphia, Pa.; William Heap, Muskegon, Mich.; Standard Gas Fixture Company, Bound Brook, N. J.; Kennedy Valve Mfg. Company, Coxsackie, N. Y.; Irwin Auger Bit Company, Wilmington, Ohio; American Chain Company, Zanesville, Ohio; C. Drew & Co., Kingston, Mass.; Cahill Iron Works, Chattanooga, Tenn.; Willets Mfg. Company, Trenton, N. J.; Berger Mfg. Company, Canton, Ohio; Riverside Boiler Works, Boston, Mass.; Hoffman, Corr Mfg. Company, New York City; R. Bliss Mfg. Company, Pawtucket, R. I.; United States Wire Mat Company, Decatur, Ill.; Baltimore Oakum Works, Baltimore, Md.; Mineralized Rubber Company, New York; Jas. Robertson Mfg. Company, Baltimore; Glenn Mfg. Company, St. Charles Ill.; also D. Anderson & Son, Limited (Ship's Felt), Belfast, Ireland.

BY J. D. FRENCH COMPANY: Shelton Company, Shelton, Conn.; D. M. Bassett, Derby, Conn.; M. Seward & Son Company, New Haven, Conn.; Plymouth Mills, Plymouth, Mass.; Benedict & Burnham Mfg. Company, Waterbury, Conn.; Warwood Tool Company, Wheeling, W. Va.; Hay-Budden Mfg. Company, Brooklyn, N. Y.; Cohoes Rolling Mill Company, Cohoes, N. Y.; Hayden-Corbett Chain Company, Columbus, Ohio.

BY FRENCH & LINFORTH: American Axe & Tool Company, Glassport, Pa.; National Saw Company, Newark, N. J.; Thomas Devlin Mfg. Company, Philadelphia; Hoffman & Billings Mfg. Company, Milwaukee, Wis.; Birmingham Pipe & Casting Company, Birmingham, Ala.

BY HUGHSON & MERTON: American Iron & Steel Mfg. Company, Lebanon, Pa.; M. S. Brooks & Son, Chester, Conn.; Coes Wrench Company, Worcester, Mass.; Enterprise Mfg. Company, Philadelphia, Pa.; Heller Bros. Company, Newark, N. J.; Franklin Moore Company, Winsted, Conn.; Ohio Tool Company, Columbus, Ohio; E. C. Stearns & Co., Syracuse, N. Y.; Wiebusch & Hilger, New York, also J. C. McCarty & Co., New York.

BY E. A. KEITHLEY: Central Foundry Company, New York; Findeisen & Kropf Mfg. Company, Chicago; United States Sanitary Mfg. Company, Pittsburgh; Spang, Chalfant & Co., Pittsburgh; Great Western Pottery Company, Kokomo, Ind., and Tiffin, Ohio; Milwaukee Brass Mfg. Company, Milwaukee, Wis.; Clarence H. Booth, Detroit; Buckley, Hart Mfg. Company, Detroit; Reed Mfg. Company, Erie, Pa.; H. O. Canfield, Bridgeport, Conn.; Jas. P. Marsh & Co., Chicago; Waterbury Mfg. Company, Waterbury, Conn.

BY CLEMENT P. RUST: Geuder & Paeschke Mfg. Company, Milwaukee, Wis.; A. J. Lindemann & Hoverson Company, Milwaukee, Wis.; Freeman Mfg. Company, Kalkaska, Mich.; Chicago Feather Duster Company, Chicago, Ill.; W. G. Brown Mfg. Company, Kingston, N. Y.; John Sommer's Son, Newark, N. J.

BY EUGENE C. SAUL: American Valve Company, Coxsackie, N. Y.; Piqua Handle & Mfg. Company, Piqua, Ohio; Bonney Vise & Tool Works, Incorporated, Philadelphia, Pa.; Arcade Mfg. Company, Freeport, Ill.; M. R. Campbell, Tullahoma, Tenn.; Cincinnati & Hammond Spring Company, Cincinnati, Ohio; Essex Foundry, Newark, N. J.; Helwig Mfg. Company, St. Paul, Minn.

BY W. H. STANLEY: Animal Trap Company, Abingdon, Ill.; Blair Mfg. Company, Springfield, Mass.; Diamond State Iron Company, Wilmington, Del.; Ellis & Lessig Steel & Iron Company, Pottstown, Pa.; Harrington & Richardson Arms Company, Worcester, Mass.; J. H. Halsey & Smith, Newark, N. J.; Kokomo Steel & Wire Company, Kokomo, Ind.; McKinnon Dash Company, Buffalo, N. Y.; E. F. Reece Company, Greenfield, Mass.; L. S. Starrett Company, Athol, Mass.; West End Rolling Mill Company, Lebanon, Pa.

Some of the above agencies express a desire to represent a few additional lines, and will be pleased to hear from manufacturers who are looking for a connection of this sort.

STEVENS-DURYEA AUTOMOBILE.

THE J. STEVENS ARMS & TOOL COMPANY, Chicopee Falls, Mass., are now manufacturing at their works in addition to their regular lines of Fire Arms and Rifle Telescopes, the Stevens-Duryea Automobile, driven with gasoline. It has a 7 horse-power two-cylinder opposed motor, with three speeds and reverse, all operated with the same lever. It is a two-passenger carriage with a drop seat capable of being instantly converted into a four-passenger carriage. The carriage itself is of the Stanhope type, with artillery wheels, fitted with either Fisk or Diamond double tube tires, Victoria or buggy top and full equipment. Although not built for racing, it is said to be capable of making 30 miles an hour and is a powerful hill climber. The Automobile may be inspected in New York at 54-56 West Forty-third street, and a catalogue just issued contains full descriptive matter.

C. A. BAYNON of the C. A. Baynon Company, 97-99 Reade street, New York, wholesalers of Hardware, sails for Europe June 25 on the "Frederick der Grosse," for a two months' pleasure tour of England, France, Switzerland and Italy.

THE TRAVELING SALESMAN HIS METHODS AND CONTROL

BY SAMUEL MASTERS.

CHAPTER XXII.—SPECIAL AIDS TO SALESMEN.

OCCASIONALLY a traveler needs support in an emergency and a man from the office goes to help him. It may be that there is a large stock order to be taken, and if he is a new man on the road and not fully cognizant of all the ins and outs of the firm's methods an older man is sent to give him confidence and needed information. Perhaps the retailer is about to make a bid for the finishing Hardware for a large building, and the Builders' Hardwareman goes out with a trunk filled with suitable samples, prepared to quote prices on this, the most intricate of all the lines the Hardwareman handles. At times some large factory is ready to place its annual order for supplies, and at the jobber's request the manufacturer of a special line will

Send a Man to Help the Jobber's Salesman

gain the trade through a local retailer. There is one county seat in Ohio where a large machinery manufacturer buys nearly everything he uses from a friend of his boyhood who is in the Hardware business, and the jobber who can meet factory prices on the favored brands of goods reaps a harvest. At times one jobber's salesman has the manufacturer's man sent to meet him there and help secure the trade, and he thus handles a business he could not otherwise hope to do. It is necessary, however, to be certain that the manufacturer will be loyal to the jobber, or the bringing of the maker's representative into such close relations with the consuming purchaser may lose the business to both the confiding jobber and the local Hardware dealer.

Builders' Hardware Samples.

In selling Builders' Hardware it is the custom of some jobbers to keep a sample trunk filled with samples of the fine goods ready to ship at a moment's notice, and to dispatch it to any point where a retailer is endeavoring to secure an order for trimming a fine residence, a business block or a public building. In many of the smaller towns the local sentiment is strongly in favor of purchasing from local dealers the supplies for any public building, and where the goods used are of a quality and character superior to those usually required in town such a trunk is a valuable ally. One jobber secured orders for two court houses with the aid of such a trunk, besides a number of other buildings of lesser note.

Special Trips of Salesmen.

By watching the sales it can be seen on which routes the profitable lines, such as Cutlery and Sporting Goods, are neglected. When other means fail, it has been found profitable to send out a special salesman to accompany the regular incumbent over his route and sell the particular line to which it is desired to call attention. It is usually found that the profits on the goods sold will more than pay the expenses for the extra man, while the impetus to trade will make the investment a paying one for a long while to come. At times, when the salesman is unusually obdurate and resents a proposition to send a man with him, it is better to send the special salesman over the route a week ahead of or behind him. He is sure to hear of the orders given, and knows that he must confess to incapacity or neglect. If the special salesman follows him he cannot make the excuse that he could not sell because the orders were taken before he arrived.

Seasonable Help in Best Territory.

When the jobber's establishment is properly divided into departments the men in the house come in time to know where good orders in the various lines are to be obtained, and at certain seasons it is found to pay to send out special men to help the regular salesman to land the business. Thus a man will be sent out with a line of Saddlery Hardware, of Cutlery or of Sporting Goods, visiting the sections where the goods are most in demand. If the jobber is fair to his regular salesmen they are told when the special man will be at the points touched in their territory, and will be given a chance to be on hand and to share in the proceeds.

Special Sample Trunks.

One jobber—the one who trimmed the court houses mentioned—fits out several sets of samples of Saddlery, Blankets, Robes, &c., and sends them out over carefully laid out routes in charge of the men who travel there. The same thing is done on a smaller scale with Fishing Tackle and Sporting Goods in general, and it is claimed that the results are highly satisfactory.

Checking Former Purchases.

Another method pursued with good effect by a Southern jobber is to keep a careful analysis of the sales in each of the principal lines of season goods, which will tell him at a glance who bought, the quantity and the date of purchase. When prices are issued for any of these lines each salesman is furnished with a list of the customers of the previous year in his territory, and is exhorted to try to sell all of them and to increase the list. The mail order department has the same information at its command and solicits orders by correspondence. As orders come in they are checked upon the list, and a vigorous fire kept up until it is certain that the ground has been covered. It is surprising how much of the trade can be held year after year by this simple method.

Excursions to Customers.

A few years ago the Boards of Trade of Cleveland, Toledo and (I think) Detroit inaugurated a series of trade extension excursions, which were participated in by the merchants and manufacturers belonging to these bodies. Special trains were run over selected routes; the excursionists were *fêted* at each principal town and given a cordial welcome everywhere, and it was claimed that much good resulted. Whether the benefit was permanent is a question. The salesmen on the routes touched by the trips were often invited to accompany their employers, and thus the men got a little added prestige and were at times able to prove their statements regarding the inability to get business from various firms.

Excursions to Jobbing Points.

Later other excursions were run into various cities from the surrounding towns, tickets being sold at greatly reduced rates, with special rebates to purchasers of goods to certain amounts. These did not pay in immediate results, but a large number of country dealers were induced to take a trip they would not otherwise have made and become acquainted with the men with whom they had dealt through salesmen. In a number of instances men who had bought mainly from jobbers in other towns transferred their purchases to their newly made friends, so that in the long run the investment was undoubtedly a good one.

Advance Notices.

When a new salesman is sent out over an old route he can be aided by the house on his first two or three trips over his route by letters sent out ahead of him announcing his advent and soliciting for him a continuance of the favor his predecessor enjoyed. This gives him a sort of official backing and acquaints the customers with the name of the coming man, so that he is not quite so much a stranger as though he came unheralded. The first few times over a route are the most trying, and any help of this kind that can be given is well worth the while.

A Word in Season.

So, too, does it pay to support the salesman loyally in all correspondence. He is the jobber's visible representative. Frequently he is the only man from the house whom the retailer ever meets. It is important that he should seem to have the confidence of his employer, and an expression of approval of him or confidence in him never is amiss when it can be given naturally, and a corresponding care should be taken not to needlessly use disparaging language or to blame him when it can be avoided. The house that exacts a loyal support must be ready to give it.

HARDWARE FACTORY COST METHODS.

TUTHILL SPRING COMPANY'S MANUFACTURING COSTS.

TUTHILL SPRING COMPANY, Chicago, Ill., have a clear and simple method of estimating costs of their products, as illustrated in the accompanying reproductions of their forms. In Fig. 1 the method they employ in estimating the cost of any item and bringing together the different elements of such cost is shown. In this case the estimate is made on 100 pairs of Elliptical Springs, the illustration, Fig. 1, showing the detailed estimate of the cost.

When piece work is paid the cost of the various operations is, of course, known; but if it is day work the cost can be obtained by a simple division of the wages by the product. The company are thus in possession of the actual costs of the various operations through which a given product passes in the process of manufacture. These costs of labor are shown in Fig. 1. In addition to the labor cost there is the sundry labor which cannot be put among the operations, such as transporting material, cleaning the shop, shipping the goods, &c. From their pay rolls they ascertain the proportion this sundry labor bears to the producing labor and add it to the total of the cost of producing labor. This is represented in Fig. 1 by the 15 per cent. which is added to cover the sundry labor.

Estimate on 100 pairs Elliptic springs

Labor					
400	eyes	at	.20	80	
400	heads	"	.50	2.00	
100	cut	"	.05	.50	
400	trimmed	"	.20	.80	
400	tapered	"	.04	.16	
100	punched	"	.05	.40	
100	fitted	"	.10	.80	
100	grind	"	.45	3.60	
200	pin	"	1.00	2.00	
200	finished	"	.02½ea	.5.00	
				27.06	
	Sundry Labor 15%			3.31	
					25.37
Bolts & malleables					
400	end bolts	at	.01	4.00	
400	center bolts	"	.5	2.00	
100	clips 160 lbs.	"	.03½	5.20	
	malleables	"			11.20
	Sundry expense 32% of labor				8.09
					44.66
	Steel 1700#	at 3¼¢		Net cost	51.00
					95.66
	Fixt. expense 1/3 labor				8.45
				Gross cost	104.11

Fig. 1.—Estimate Blank.

In addition to this the company keep track of their variable expenses, such as fuel for heating metal, cartage, supplies and maintenance of plant, which vary almost in proportion to the product. They have learned by their experience what proportion this bears to the total labor cost, and they add this proportional amount, which is based on the weight of material. This is shown in Fig. 1, where such sundry expenses are covered by the addition of 32 per cent. on the total of the gross labor. In addition to these items there still remain the fixed charges, rent, power, interest, &c. The company estimate the proper proportion of these by the proportional value of the goods. Such fixed expenses are covered in the estimate shown herewith by the addition to the other elements of cost of 33 1-3 per cent. of the gross labor. There still remains the cost of material used. This is shown in the estimate herewith by the charge of $51 for the steel which enters into the Springs in question, and the Bolts and Malleables, Clips, &c., which are also used in their construction, aggregating $11.20. These elements of cost give the total of $104.11.

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Machinery Patterns, Drawings, &c.

ESTIMATE OF LOSS OR GAIN FOR 190-- IN DEPARTMENT ONE.

Month	Estimated Steel Used. Pounds Used Including Scrap Made	Price per lb.	Value	Malleables and Bolts. Price per lb. of Product	Value	Labor Cr. lb. of Product	Wages Paid	(Variable Expenses) Supplies. % for Dep't	Cr. lb. of Product	Cost	Fixed Expenses % for Dep't	Cr. lb. of Product	Cost	Total Cost. Cr. lb. of Product	Amount	Sales. Pounds Sold	Average Price	Amount	Loss	Gain
1 mo.	171,334	2½	$4283.35		$384.83		$2214.06	20		$465.88	15		$348.00		$6216.12	7525	6.89	$10791.03	--	$4494.91
2 mo.																				
3 mo.																				
4 mo.																				
5 mo.			YC							YC								YC		
6 mo.																				
7 mo.																				
8 mo.																				
9 mo.																				
10 mo.																				
11 mo.																				
12 mo.																				
Total Year	1413733		$6241.50		$570.80		$2269234			$924.33			$3577.15		$9006.12	1206708	7¢	$90 662.55		$76.56 cr
ACTUAL RESULTS WHEN VERIFIED BY INVENTORY.																				
190--	1261422		$5246901	033/100	$491.26	1m	$2269234	21	05¢/100	$573.27	4½	107	$3473.31	62¢	$8699.19	1261150	7¢	$8828.61		$128.46

Fig. 2.—Estimate of Loss or Gain.

$100,000, and a few years later these were sold for a very small fraction of this sum. There are other items in this line of manufacture which bear a close relation to patterns, so far as their cost compared with their actual market value is concerned, and which instead of being carried at or near their original cost should have a large portion charged to production of goods with which they are connected.

Then there is another item frequently overlooked in the largest and best regulated factories—that of waste. I do not mean only waste stock, spoiled parts and finished goods, but also shrinkage in melting, &c. How many manufacturers know what their shrinkage or loss in melting iron is? How many what the loss in melting brass and other soft metals? And yet these losses are frequently an important part of the costs. There are too many "office" costs (really guesses and estimates) and too little familiarity with details of factory by those formulating systems of keeping costs. Labor costs, production costs, material costs, are not all which are to be taken into consideration; before the goods are ready to sell add accounting, advertising and selling costs.

Losses in Manufacture

You might suggest that results of failure to properly take care of these items would show on balance sheet of the year's business when the inventory is taken

Fictitious Balance Sheet

To this we would reply, certain items being carried at a fictitious value would not show the true condition of the business, and where there is a large variety of goods made losses incurred in manufacture of some items (because of lack of proper costs) may be offset by unknown more attractive profits on others. Using costs of items referred to above as fictitious value in inventory may show a profit, and only when money runs out or the business is wound up is the true condition of affairs realized. Even then this condition may be charged to "undue competition."

REUNION OF A. C. WILLIAMS' EMPLOYEES.

THE employees of A. C. Williams, Ravenna, Ohio, had a grand reunion of past and present employees at Ravenna, June 18, in which about 500 visitors, who came on a special train from Cleveland and Chagrin Falls, participated, accompanied by two bands of respectively 60 and 30 pieces. Mayor H. W. Riddle of Ravenna welcomed the visiting guests, George H. Waite, president of the A. C. Williams Old Employees' Association, responding for them. After dinner there were impromptu speeches and also music by the Great Western and Chagrin Falls bands, as well as by Wallace's Orchestra and a male quartet, together with an address by A. C. Williams. The prevailing sentiment in the addresses by the employees and guests was the cordial spirit and mutual helpfulness employers and employees had always manifested toward each other, under the guidance of John W. Williams, who established the business at Chagrin Falls in 1844, and who was also Mayor of the town. The community of interest in these works is attributed to the sense of equity and justice, fairmindness and Christian method of dealing with the employees by both founder and son, coupled with the integrity of the employees themselves, who have heartily reciprocated the sentiment.

The business of A. C. Williams was established in Chagrin Falls, Ohio, 59 years ago by John W. Williams, and was operated under his management for 42 years until he died in 1886, since which time it has been under the ownership and management of his son, A. C. Williams. The plant was entirely destroyed by fire December 2, 1889, and was rebuilt and in operation again on March 1, 1890. On Thanksgiving eve, 1892, fire again destroyed the works. For better fire protection and other business reasones a site was then secured at Ravenna, where the plant has since been located. The products of the conern, include large assortments of Hardware, House Furnishing Goods, Specialties, Toys, &c.

THE SPEER HARDWARE COMPANY'S CATALOGUE.

THE SPEER HARDWARE COMPANY, Fort Smith, Ark., have just issued a catalogue of 1119 pages, substantially bound in cloth. The catalogue has been compiled with a view to illustrating such goods as would meet the demands of the company's trade. It has been the endeavor to condense into as small a space as possible such information as a buyer would seek in consulting its pages, and to bring together in appropriate groups the various classes of goods carried in stock. To this end a department index has been prepared, as follows:

Mechanics' Edged Tools and Hand Farm Implements.
Builders' Hardware, Locks, &c.
Miscellaneous Hardware.
House Furnishing Goods.
Enameled Ware, Tinware, Galvanized Iron Ware, Nickel Plated Ware, Tinners' Tools and Metals.
Cutlery, Razors, Scissors, Shears, Carvers, &c.
Pumps, Packings, Steam Fittings, Belting, Hose, &c.
Sporting Goods, Firearms, Ammunition, Fishing Tackle, &c.
Heavy Hardware, Bar Iron and Steel, Corrugated and V Crimp Roofing, Wagon and Carriage Wood Work.

The foregoing serves to show the scope of the stock carried. In addition there is an alphabetically arranged index of 23 pages. Some of the tools are illustrated in colors, showing their appearance to better advantage. The book is well arranged, well printed, and indicates a commendable degree of enterprise on the part of the company. The business was established in 1887 and incorporated in 1893.

AUSTRALIAN NOTES.

FROM A SPECIAL SYDNEY CORRESPONDENT.

THAT our State has undergone a very severe trial none can possibly deny, and its well-known recuperative powers will be taxed to the utmost before we can regain our old condition; but that we shall "strike form" is certain, as our resources—mineral, pastoral and agricultural—are of an undoubted character, and given only fair assistance by Nature, we will make our way clearly and surely to a prosperous future. The causes of our depression are various, but surely the most serious antagonist to our welfare has been the drought. This time almost the whole of Australia has been submitted to a state that it has not been our lot to previously experience, and the fact that the drought has not been confined to one State has made matters serious for us. Had we alone been affected we might have possibly picked up some of our lost business by a keener competition for interstate trade, but this remuneration has been denied us, because merchants in all the States have been quite keen enough to satisfy their local demands by an immediate response, and we have as a consequence had few inquiries comparatively from outside.

Pump, Wind Mill and Irrigation Business.

The Pump and irrigation business has certainly been enlivened, and the general treatment of water conserving, raising and distributing has been an all important factor with the country people. Farmers and settlers, who previous to this period never knew the necessity of looking to artificial means to supply their stock, have been forced to invest in pumping plants and take a few practical lessons on this subject. It will no doubt be a lesson to many, and in future Pumps, Wind Mills and Hydraulic Rams will be looked upon by them with almost as critical an eye as Reapers and Binders are.

Standardizing Parts.

The difficulties attendant on pumping work and appurtenances should be obviated as far as practicable by manufacturers, and a uniformity of parts and a standard of thread maintained. The country people are not, as a rule, acquainted with mechanical matters, and it is difficult to fill orders for duplicate parts where the possibility of error in threads and sizes occur by reason of changes. It is quite reasonable to suppose that manufacturers will not care to alter their standard, &c., and so apparently copy an opponent, but a great boon would be conferred on users if a standard were established.

Water Pipes in Moderate Lengths.

Tubes for water, &c., have been a source of annoyance where connections and extensions have had to be made and the threads differ, but this difficulty has apparently been overcome and the American Tubes now imported are of English standard. This has evidently been quite recognized as a necessity for this market, and rightly so, too, for a difference makes a sale difficult to effect. The lengths of Tubes must be borne in mind, and very long lengths should not be sent here as our traffic regulations are severe, and unless a reasonable length is adhered to the carriage of these through the city streets between 8 a.m. and 6 p.m. is prohibited. The act says that projections more than 6 feet before or behind the body of the vehicle are not allowed, and such lengths must have a special permit applied for for every load or else carried at other times than specified.

American Irrigation Methods a Stimulus to Australians.

Some of our agricultural people have been to the United States quite recently and returned much impressed with the irrigation schemes existent there, and it will doubtless serve as a stimulus for more of this reproductive class of work here. When it is more apparent to our growers and the initial expenses of installation lessened, doubtless a big trade will be done with our people in the goods necessary for this work.

Tools for Machinists and Plumbers.

American tools for plumbers and engineers are coming to the front and finding a ready sale, though such a foothold as the English goods have is not easy to displace, and the old idea that United States manufactures are made only to sell is being removed. Stocks and Dies and Screwing (Thread Cutting) Tackle sell well, and by reason of the great inducement in price, coupled with the fact that the quality is undoubtedly good, buyers are found readily. Lathes, Forges, Blowers, &c., are well to the fore and freely advertised, many firms carrying special lines in these goods and apparently see no reason to regret their choice, as users speak well of their value. Some high-class American Lathes have been introduced here and are in use by manufacturers. The strength of these machines is quite a feature and the finish up to anything imported; the working character of the machines and tools is beyond question.

Bathing Apparatus.

American Enameled Baths are in nearly every warehouse and are selling well, the appearance and general getup appealing to the public. The self setting, roll top Roman Bath is certainly the one for sale, and apparently the English Bath is "out of it." Some customers, no doubt with a conviction hard to die, prefer the English ware, and state as a claim to the correctness of their judgment that British goods are known and proved to stand, and though the American may wear well, it has not anything like the record of the other, and until this record is reached they hold their opinion and purchase accordingly. Sinks and Basin Ware have not the hold that the Bath has, but probably alterations of style and price will effect a change.

Sanitary Fittings.

Lead Traps and other sanitary goods are in demand, and while on the subject of the former it will be well for makers to remember that weights of lead must not exceed the specified order (where prices are not mentioned), as merchants are quite aware of the necessary weights and will order accordingly. Any excess of weight only means added cost and added freight landing charges, duty, &c., the latter charges of course only applying where screws are fixed.

Steam and Other Valves.

Steam Valves and general requirements of this heading are freely ordered now, the great reason being one of price, as English steam ware is considerably dearer, and though there are a good many importers of first-class American Steam Valves, yet the majority of these goods coming to this market are of the lighter and cheaper quality. This is of course due to the demand of buyers who are regulated in their dealings by the fact that certain jobs carry no specification and they buy accordingly. The iron body Gate Valve and the all iron one, for cyanide work, are quite a recognized institution, and for mining work a large trade is done and quite a satisfactory business both in regard to price and quality has been worked up.

Royal Agricultural Exposition.

Our Royal Agricultural Show has just completed a most satisfactory exhibition, and though the state of the country is certainly not good yet the attendance and general appearance of the people would belie the fact. On the first three days of the show the gate receipts were £1370 in excess of last year, so that a great section of the people must take an interest in machinery and matters affecting agriculture. While a good section of the visitors attend to the ring and show events, yet an enormous number pay every attention to machinery and its work, and when effective practical demonstrations are given the results are satisfactory. Some firms devote a great amount of money to their display and recognize the necessity of making every detail of their machinery and working exhibit a special care, as it is apparent that where a salesman has to interest a concourse of people obstacles must be removed and apparatus with the fewest complications shown, even though not quite so effective perhaps as another which may be selected by the buyer. Our exposition is recognized as a most excellent means of showing the people what perhaps they might not otherwise hear of, and any business with a new idea, invention or useful machine of any sort nearly always has a stand there.

A Market for Oil Fuel Engines.

Oil Engines were especially noted, and their capabilities for wood sawing, grinding grain and feed, pumping water, rock breaking, &c., were very marked. The adaptability of Oil Engines and the simplicity and ease with which they can be worked, together with the portability of both Engine and fuel, make them at once arrest the attention of interested parties, and a closer acquaintance in nearly every case ripens to a friendship. There is a growing feeling that the Oil Engine has come to stay.

TRADE ITEMS.

Pacific Hardware & Steel Company, San Francisco, Cal., have bought a considerable tract of land, some 4 acres in extent, adjacent to their rolling mill property in Portland, Ore., and will erect sufficient warehouses to take care of their immediate requirements, as well as leaving room for future development. The rolling mill is situated on a spur track controlled by the company, and the warehouses contemplated will thus have every facility for the prompt and economical handling of freight, both incoming and outgoing. In these warehouses the company will carry quite an assortment of staple goods. They are intending to increase their assortment of iron and steel products to compare favorably with the very large stock carried in San Francisco. They will also carry the necessary assortment of all staple goods generally, covering such items as are largely affected in price by freight rates, together with such other goods as their patrons will expect to have delivered at short notice.

The Tower Mfg. Company, whose general offices are located at Cincinnati, Ohio, announce the purchase of all the machinery and raw material on hand of the Ironton Tack Company, who are now out of business.

H. C. Slingsby, patentee of the Slingsby Hand and Warehouse Trucks, returned to England on the "Lucania," June 13, after a hurried visit to his Canadian branch, where, we are advised, he practically installed a complete new plant. Returning to New York he arranged for larger manufacturing facilities than he has had in this territory, locating at 156 West street, New York, where it is the intention to fit up quickly for the production of Trucks of any of their many designs at short notice under the supervision of his manager, R. F. Harison. Their present office at 253 Broadway will be transferred to the above address. The main works are in England.

Sargent & Co., 147-153 Leonard street, New York, have arranged in attractive form on the four walls of the room reserved for their salesmen when in town, advertising booklets, folders, &c., appropriately mounted on large cards, such as are being constantly sent out to the customers, present and prospective, of the house. There is a total of 45 exhibits in all, attractively printed and illustrated, which have been issued from time to time, the purpose of the display being to arrange in concrete form the various pamphlets, &c., as a reminder to the salesman of what the staff at home are doing to help him in his canvass of the trade.

Oklahoma Storage & Brokerage Company, Oklahoma City, O. T., are now building a large stone storage house, situated, like their other warehouse, on the railroad tracks, which will give them about 60,000 square feet of floor space. The company do a general storage, brokerage, transfer and commission business, principally in Shelf and Heavy Hardware. S. H. Brown is president of the company; E. E. Wash, vice-president, and Kee R. McKee, secretary and treasurer.

A. F. Brombacher & Co., dealers in Hardware, Cutlery, Mechanics' Tools, &c., 29 and 31 Fulton street, New York, have been incorporated under the same style, William H. Hanna being president and Aug. F. Brombacher treasurer. It is also announced that Edward Perpeet, Alfred J. Sellers and Augustus F. Brombacher, Jr., who were for many years identified with the copartnership, have become directly interested in the business of the corporation.

HARDWARE FACTORY COST METHODS.

TUTHILL SPRING COMPANY'S MANUFACTURING COSTS.

TUTHILL SPRING COMPANY, Chicago, Ill., have a clear and simple method of estimating costs of their products, as illustrated in the accompanying reproductions of their forms. In Fig. 1 the method they employ in estimating the cost of any item and bringing together the different elements of such cost is shown. In this case the estimate is made on 100 pairs of Elliptical Springs, the illustration, Fig. 1, showing the detailed estimate of the cost.

When piece work is paid the cost of the various operations is, of course, known; but if it is day work the cost can be obtained by a simple division of the wages by the product. The company are thus in possession of the actual costs of the various operations through which a given product passes in the process of manufacture. These costs of labor are shown in Fig. 1. In addition to the labor cost there is the sundry labor which cannot be put among the operations, such as transporting material, cleaning the shop, shipping the goods, &c. From their pay rolls they ascertain the proportion this sundry labor bears to the producing labor and add it to the total of the cost of producing labor. This is represented in Fig. 1 by the 15 per cent. which is added to cover the sundry labor.

Estimate on 100 pairs Elliptic springs

Labor

400	eyes	at .20	.80	
400	heads	" .50	2.00	
100	cut	" .50	.50	
400	trimmed	" .20	.80	
400	tapered	" .04	.16	
100	punched	" .05	.40	
100	fitted	" .25	2.50	
100	grind	" .45	3.20	
200	pin	" 1.00	2.00	
200	finished	" .02½	.50	
			22.06	
	Sundry Labor 15%		3.31	25.37
	Bolts & malleables			
400	end bolts	at .01	4.00	
400	center bolts	" .5	2.00	
100	clips 160 lbs.	" .03½	5.20	
	malleables	" ----	------	11.20
	Sundry expense 32% of labor			8.09
				44.06
Steel	1700# at 3½¢			51.99
			Net cost	95.66
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			Gross cost	104.11

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In addition to this the company keep track of their variable expenses, such as fuel for heating metal, cartage, supplies and maintenance of plant, which vary almost in proportion to the product. They have learned by their experience what proportion this bears to the total labor cost, and they add this proportional amount, which is based on the weight of material. This is shown in Fig. 1, where such sundry expenses are covered by the addition of 32 per cent. on the total of the gross labor. In addition to these items there still remain the fixed charges, rent, power, interest, &c. The company estimate the proper proportion of these by the proportional value of the goods. Such fixed expenses are covered in the estimate shown herewith by the addition to the other elements of cost of 33 1-3 per cent. of the gross labor. There still remains the cost of material used. This is shown in the estimate herewith by the charge of $51 for the steel which enters into the Springs in question, and the Bolts and Malleables, Clips, &c., which are also used in their construction, aggregating $11.20. These elements of cost give the total of $104.11.

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ESTIMATE OF LOSS OR GAIN FOR 190__ IN DEPARTMENT ONE.

Month	Estimated Steel Used. Pounds Used Including Scrap Made	Price per lb.	Value	Malleables and Bolts. Price per lb. of Product	Value	Labor Pr. lb. of Product	Wages Paid	(Variable Expenses) Supplies. % for Dept.	Pr. lb. of Product	Cost	Fixed Expenses % for Dep't	Pr. lb. of Product	Cost	Total Cost. Pr. lb. of Product	Amount	Sales. Pounds Sold	Average Price	Amount	Loss	Gain
1 mo.	171,334	2½	$4283.35		$384.83		$2249.96	20		$1465.88	15		$948.00		$8162.12	76525	6.89	$12791.03	—	$4629.91
2 mo.																				
3 mo.																				
4 mo.																				
5 mo.			YC							YC								YC		
6 mo.																				
7 mo.																				
8 mo.																				
9 mo.																				
10 mo.																				
11 mo.																				
12 mo.																				
Total Year	1413733		$36241.50		$4570.80		$22692.74			$7924.33			$13577.15		$89006.12	1204740	7¢	$90 66255		$16.56 03
ACTUAL RESULTS WHEN VERIFIED BY INVENTORY.																				
190—	1264923		$32469.01	03	$4191.24	1¢	$22692.74	21	02½	$5873.27	9½	10¢	$13473.31	63¢	$38699.19	1269150	7¢	$88826.65		$588.46

Fig. 2.—Estimate of Loss or Gain.

$100,000, and a few years later these were sold for a very small fraction of this sum. There are other items in this line of manufacture which bear a close relation to patterns, so far as their cost compared with their actual market value is concerned, and which instead of being carried at or near their original cost should have a large portion charged to production of goods with which they are connected.

Then there is another item frequently overlooked in the largest and best regulated factories—that of waste. I do not mean only waste stock, spoiled parts and finished goods, but also shrinkage in melting, &c. How many manufacturers know what their shrinkage or loss in melting iron is? How many what the loss in melting brass and other soft metals? And yet these losses are frequently an important part of the costs. There are too many "office" costs (really guesses and estimates) and too little familiarity with details of factory by those formulating systems of keeping costs. Labor costs, production costs, material costs, are not all which are to be taken into consideration; before the goods are ready to sell add accounting, advertising and selling costs.

Losses in Manufacture

You might suggest that results of failure to properly take care of these items would show on balance sheet of the year's business when the inventory is taken

Fictitious Balance Sheet

To this we would reply, certain items being carried at a fictitious value would not show the true condition of the business, and where there is a large variety of goods made losses incurred in manufacture of some items (because of lack of proper costs) may be offset by unknown more attractive profits on others. Using costs of items referred to above as fictitious value in inventory may show a profit, and only when money runs out or the business is wound up is the true condition of affairs realized. Even then this condition may be charged to "undue competition."

REUNION OF A. C. WILLIAMS' EMPLOYEES.

THE employees of A. C. Williams, Ravenna, Ohio, had a grand reunion of past and present employees at Ravenna, June 18, in which about 500 visitors, who came on a special train from Cleveland and Chagrin Falls, participated, accompanied by two bands of respectively 60 and 30 pieces. Mayor H. W. Riddle of Ravenna welcomed the visiting guests, George H. Waite, president of the A. C. Williams Old Employees' Association, responding for them. After dinner there were impromptu speeches and also music by the Great Western and Chagrin Falls bands, as well as by Wallace's Orchestra and a male quartet, together with an address by A. C. Williams. The prevailing sentiment in the addresses by the employees and guests was the cordial spirit and mutual helpfulness employers and employees had always manifested toward each other, under the guidance of John W. Williams, who established the business at Chagrin Falls in 1844, and who was also Mayor of the town. The community of interest in these works is attributed to the sense of equity and justice, fairmindness and Christian method of dealing with the employees by both founder and son, coupled with the integrity of the employees themselves, who have heartily reciprocated the sentiment.

The business of A. C. Williams was established in Chagrin Falls, Ohio, 59 years ago by John W. Williams, and was operated under his management for 42 years until he died in 1886, since which time it has been under the ownership and management of his son, A. C. Williams. The plant was entirely destroyed by fire December 2, 1889, and was rebuilt and in operation again on March 1, 1890. On Thanksgiving eve, 1892, fire again destroyed the works. For better fire protection and other business reasones a site was then secured at Ravenna, where the plant has since been located. The products of the conern, include large assortments of Hardware, House Furnishing Goods, Specialties, Toys, &c.

THE SPEER HARDWARE COMPANY'S CATALOGUE.

THE SPEER HARDWARE COMPANY, Fort Smith, Ark., have just issued a catalogue of 1119 pages, substantially bound in cloth. The catalogue has been compiled with a view to illustrating such goods as would meet the demands of the company's trade. It has been the endeavor to condense into as small a space as possible such information as a buyer would seek in consulting its pages, and to bring together in appropriate groups the various classes of goods carried in stock. To this end a department index has been prepared, as follows:

Mechanics' Edged Tools and Hand Farm Implements.
Builders' Hardware, Locks, &c.
Miscellaneous Hardware.
House Furnishing Goods.
Enameled Ware, Tinware, Galvanized Iron Ware, Nickel Plated Ware, Tinners' Tools and Metals.
Cutlery, Razors, Scissors, Shears, Carvers, &c.
Pumps, Packings, Steam Fittings, Belting, Hose, &c.
Sporting Goods, Firearms, Ammunition, Fishing Tackle, &c.
Heavy Hardware, Bar Iron and Steel, Corrugated and V Crimp Roofing, Wagon and Carriage Wood Work.

The foregoing serves to show the scope of the stock carried. In addition there is an alphabetically arranged index of 23 pages. Some of the tools are illustrated in colors, showing their appearance to better advantage. The book is well arranged, well printed, and indicates a commendable degree of enterprise on the part of the company. The business was established in 1887 and incorporated in 1893.

AUSTRALIAN NOTES.

FROM A SPECIAL SYDNEY CORRESPONDENT.

THAT our State has undergone a very severe trial none can possibly deny, and its well-known recuperative powers will be taxed to the utmost before we can regain our old condition; but that we shall "strike form" is certain, as our resources—mineral, pastoral and agricultural—are of an undoubted character, and given only fair assistance by Nature, we will make our way clearly and surely to a prosperous future. The causes of our depression are various, but surely the most serious antagonist to our welfare has been the drought. This time almost the whole of Australia has been submitted to a state that it has not been our lot to previously experience, and the fact that the drought has not been confined to one State has made matters serious for us. Had we alone been affected we might have possibly picked up some of our lost business by a keener competition for interstate trade, but this remuneration has been denied us, because merchants in all the States have been quite keen enough to satisfy their local demands by an immediate response, and we have as a consequence had few inquiries comparatively from outside.

Pump, Wind Mill and Irrigation Business.

The Pump and irrigation business has certainly been enlivened, and the general treatment of water conserving, raising and distributing has been an all important factor with the country people. Farmers and settlers, who previous to this period never knew the necessity of looking to artificial means to supply their stock, have been forced to invest in pumping plants and take a few practical lessons on this subject. It will no doubt be a lesson to many, and in future Pumps, Wind Mills and Hydraulic Rams will be looked upon by them with almost as critical an eye as Reapers and Binders are.

Standardizing Parts.

The difficulties attendant on pumping work and appurtenances should be obviated as far as practicable by manufacturers, and a uniformity of parts and a standard of thread maintained. The country people are not, as a rule, acquainted with mechanical matters, and it is difficult to fill orders for duplicate parts where the possibility of error in threads and sizes occur by reason of changes. It is quite reasonable to suppose that manufacturers will not care to alter their standard, &c., and so apparently copy an opponent, but a great boon would be conferred on users if a standard were established.

Water Pipes in Moderate Lengths.

Tubes for water, &c., have been a source of annoyance where connections and extensions have had to be made and the threads differ, but this difficulty has apparently been overcome and the American Tubes now imported are of English standard. This has evidently been quite recognized as a necessity for this market, and rightly so, too, for a difference makes a sale difficult to effect. The lengths of Tubes must be borne in mind, and very long lengths should not be sent here as our traffic regulations are severe, and unless a reasonable length is adhered to the carriage of these through the city streets between 8 a.m. and 6 p.m. is prohibited. The act says that projections more than 6 feet before or behind the body of the vehicle are not allowed, and such lengths must have a special permit applied for for every load or else carried at other times than specified.

American Irrigation Methods a Stimulus to Australians.

Some of our agricultural people have been to the United States quite recently and returned much impressed with the irrigation schemes existent there, and it will doubtless serve as a stimulus for more of this reproductive class of work here. When it is more apparent to our growers and the initial expenses of installation lessened, doubtless a big trade will be done with our people in the goods necessary for this work.

Tools for Machinists and Plumbers.

American tools for plumbers and engineers are coming to the front and finding a ready sale, though such a foothold as the English goods have is not easy to displace, and the old idea that United States manufactures are made only to sell is being removed. Stocks and Dies and Screwing (Thread Cutting) Tackle sell well, and by reason of the great inducement in price, coupled with the fact that the quality is undoubtedly good, buyers are found readily. Lathes, Forges, Blowers, &c., are well to the fore and freely advertised, many firms carrying special lines in these goods and apparently see no reason to regret their choice, as users speak well of their value. Some high-class American Lathes have been introduced here and are in use by manufacturers. The strength of these machines is quite a feature and the finish up to anything imported; the working character of the machines and tools is beyond question.

Bathing Apparatus.

American Enameled Baths are in nearly every warehouse and are selling well, the appearance and general getup appealing to the public. The self setting, roll top Roman Bath is certainly the one for sale, and apparently the English Bath is "out of it." Some customers, no doubt with a conviction hard to die, prefer the English ware, and state as a claim to the correctness of their judgment that British goods are known and proved to stand, and though the American may wear well, it has not anything like the record of the other, and until this record is reached they hold their opinion and purchase accordingly. Sinks and Basin Ware have not the hold that the Bath has, but probably alterations of style and price will effect a change.

Sanitary Fittings.

Lead Traps and other sanitary goods are in demand, and while on the subject of the former it will be well for makers to remember that weights of lead must not exceed the specified order (where prices are not mentioned), as merchants are quite aware of the necessary weights and will order accordingly. Any excess of weight only means added cost and added freight landing charges, duty, &c., the latter charges of course only applying where screws are fixed.

Steam and Other Valves.

Steam Valves and general requirements of this heading are freely ordered now, the great reason being one of price, as English steam ware is considerably dearer, and though there are a good many importers of first-class American Steam Valves, yet the majority of these goods coming to this market are of the lighter and cheaper quality. This is of course due to the demand of buyers who are regulated in their dealings by the fact that certain jobs carry no specification and they buy accordingly. The iron body Gate Valve and the all iron one, for cyanide work, are quite a recognized institution, and for mining work a large trade is done and quite a satisfactory business both in regard to price and quality has been worked up.

Royal Agricultural Exposition.

Our Royal Agricultural Show has just completed a most satisfactory exhibition, and though the state of the country is certainly not good yet the attendance and general appearance of the people would belie the fact. On the first three days of the show the gate receipts were £1370 in excess of last year, so that a great section of the people must take an interest in machinery and matters affecting agriculture. While a good section of the visitors attend to the ring and show events, yet an enormous number pay every attention to machinery and its work, and when effective practical demonstrations are given the results are satisfactory. Some firms devote a great amount of money to their display and recognize the necessity of making every detail of their machinery and working exhibit a special care, as it is apparent that where a salesman has to interest a concourse of people obstacles must be removed and apparatus with the fewest complications shown, even though not quite so effective perhaps as another which may be selected by the buyer. Our exposition is recognized as a most excellent means of showing the people what perhaps they might not otherwise hear of, and any business with a new idea, invention or useful machine of any sort nearly always has a stand there.

A Market for Oil Fuel Engines.

Oil Engines were especially noted, and their capabilities for wood sawing, grinding grain and feed, pumping water, rock breaking, &c., were very marked. The adaptability of Oil Engines and the simplicity and ease with which they can be worked, together with the portability of both Engine and fuel, make them at once arrest the attention of interested parties, and a closer acquaintance in nearly every case ripens to a friendship. There is a growing feeling that the Oil Engine has come to stay.

TRADE ITEMS.

PACIFIC HARDWARE & STEEL COMPANY, San Francisco, Cal., have bought a considerable tract of land, some 4 acres in extent, adjacent to their rolling mill property in Portland, Ore., and will erect sufficient warehouses to take care of their immediate requirements, as well as leaving room for future development. The rolling mill is situated on a spur track controlled by the company, and the warehouses contemplated will thus have every facility for the prompt and economical handling of freight, both incoming and outgoing. In these warehouses the company will carry quite an assortment of staple goods. They are intending to increase their assortment of iron and steel products to compare favorably with the very large stock carried in San Francisco. They will also carry the necessary assortment of all staple goods generally, covering such items as are largely affected in price by freight rates, together with such other goods as their patrons will expect to have delivered at short notice.

THE TOWER MFG. COMPANY, whose general offices are located at Cincinnati, Ohio, announce the purchase of all the machinery and raw material on hand of the Ironton Tack Company, who are now out of business.

H. C. SLINGSBY, patentee of the Slingsby Hand and Warehouse Trucks, returned to England on the "Lucania," June 13, after a hurried visit to his Canadian branch, where, we are advised, he practically installed a complete new plant. Returning to New York he arranged for larger manufacturing facilities than he has had in this territory, locating at 156 West street, New York, where it is the intention to fit up quickly for the production of Trucks of any of their many designs at short notice under the supervision of his manager, R. F. Harison. Their present office at 253 Broadway will be transferred to the above address. The main works are in England.

SARGENT & Co., 147-153 Leonard street, New York, have arranged in attractive form on the four walls of the room reserved for their salesmen when in town, advertising booklets, folders, &c., appropriately mounted on large cards, such as are being constantly sent out to the customers, present and prospective, of the house. There is a total of 45 exhibits in all, attractively printed and illustrated, which have been issued from time to time, the purpose of the display being to arrange in concrete form the various pamphlets, &c., as a reminder to the salesman of what the staff at home are doing to help him in his canvass of the trade.

OKLAHOMA STORAGE & BROKERAGE COMPANY, Oklahoma City, O. T., are now building a large stone storage house, situated, like their other warehouse, on the railroad tracks, which will give them about 60,000 square feet of floor space. The company do a general storage, brokerage, transfer and commission business, principally in Shelf and Heavy Hardware. S. H. Brown is president of the company; E. E. Wash, vice-president, and Kee R. McKee, secretary and treasurer.

A. F. BROMBACHER & Co., dealers in Hardware, Cutlery, Mechanics' Tools, &c., 29 and 31 Fulton street, New York, have been incorporated under the same style, William H. Hanna being president and Aug. F. Brombacher treasurer. It is also announced that Edward Perpeet, Alfred J. Sellers and Augustus F. Brombacher, Jr., who were for many years identified with the copartnership, have become directly interested in the business of the corporation.

DEATH OF SAMUEL B. HUBBARD.

SAMUEL B. HUBBARD, president of the S. B. Hubbard Company, Jacksonville, Fla., died suddenly at his home, Sunday morning, June 21, after an acute attack of indigestion. He had been in apparently good health and had attended his business duties as usual. Mr. Hubbard was born in Wadesboro, N. C., June 13, 1833, and went to Jacksonville in 1866. A sketch of Mr. Hubbard necessarily includes much that is identified with the history of the growth and development of Jacksonville. His sound business judgment and financial ability enabled him to achieve a success in the business world which made his name known not only in the commercial circles of Jacksonville, but also throughout the entire State of Florida. The Hardware establishment that bears his name was organized in 1866 by Mr. Hubbard, and has grown to its present proportions, principally through his active management, though in recent years he had devoted considerable time to his other enterprises, among which was the Mercantile Exchange Bank. Mr. Hubbard also formed the Main Street Railroad Company, of which he was president. He was also president of the Citizens' Gas Company and the Springfield Company. Mr. Hubbard is survived by a widow, two sons and a daughter. S. B. Hubbard, Jr., being the secretary and treasurer of the company.

MISSOURI RETAIL STOVE AND HARDWARE DEALERS' ASSOCIATION.

THE MISSOURI RETAIL STOVE & HARDWARE DEALERS' ASSOCIATION are making energetic efforts to increase their membership. Their most recent movement in this direction was the circulation of a blotter, on one side of which was the following address to the nonaffiliated merchant:

Brother Hardwareman This will remind you that the Missouri Retail Stove and Hardware Dealers' Association is growing stronger every day. It needs you. You need it.

Its insurance feature, we believe, will save you one-half you pay other companies. The association has aided in defeating the Parcels Post bill, has prevented postmasters acting as agents for catalogue houses, and prevented free distribution of their catalogues to your trade.

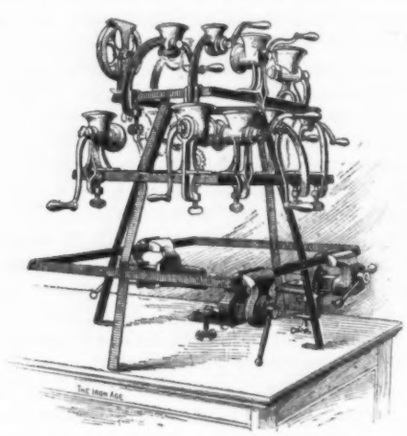
Some standard brands of goods have been removed from catalogue houses, and others listed at a price affording you a profit. Also aided in passing the Garnishment Law, which destroys deadbeatism in Missouri. It is essential that you ally yourself with this association to keep it on the statute books.

Dues are but 25 cents per month, $3 per year. Fill out inclosed blank and mail to the secretary, F. Neudorff, St. Joseph, Mo., *but do it now.*

The blotter was accompanied by an application blank.

RACK FOR MEAT CUTTERS AND VISES.

THE accompanying illustration shows a Rack made of heavy Hoop iron, on which Meat Cutters and Vises are held in the manner shown. This Rack, which



Rack for Meat Cutters and Vises.

takes up comparatively little room on the end of the counter and makes an elaborate display of the goods exhibited, is in the store of Hull Bros. Company, Danbury, Conn.

CONTENTS.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE, NORFOLK ST., LONDON, W. C., June 13, 1903.

The Week's Hardware Trade.

THE best orders recently received have come from Scotland, and are for Shipbuilders' Fittings and Builders' Hardware, as well as for Tools, Guns, Tubes, Screws, Rivets and Stamped Hollow Ware. From the seaside have come orders for Metallic Bedsteads, Lamps and Domestic Utensils generally, while a number of orders are coming in from agricultural districts for Galvanized Roofing Sheets, Fencing and Draining Apparatus, Spades, Forks, &c. With these exceptions there is a distinct slackening in the trade, particularly from London and Lancashire. In Lancashire the unsatisfactory state of the cotton trade has led to a shrinkage of demand. The export departments do not complain, for, although the Australian demand is still under normal and there is a temporary lull in orders from South Africa in consequence of the glutted state of that market, distinctly improved trade has recently been done with Argentina, America and Canada as well as India. Germany and Holland have not been buying in such large quantities as formerly, but France, Spain and Belgium show an improved tendency in Hardware and Machinery. Increased Hardware has recently been sent to Brazil and Chile, but since the altered relations between America and Cuba Midland exporters have lost considerable trade. The falling price of copper continues to restrict the general demand for brass and copper sheets and tubes. Speaking generally, however, it cannot be said that trade is in a particularly brisk condition.

The Sheffield Cutlery trade has recently received some good orders from abroad. Indeed, were it not so they would find things uncommonly bad, for there is at the present moment practically no home demand for Cutlery. America is buying from Sheffield largely just now, and a number of Sheffield houses are making special efforts to meet Canadian requirements. These efforts have met with some success.

Moving to the Seaboard.

I have mentioned a number of Midland firms during the last few years who are looking for suitable situations near the seaboard, so that in cultivating their export trade they may not be hampered with excessive inland freight rates. I hear that Newport, in South Wales, has recently been visited by a member of an important firm who have decided to acquire a site on the east side of the Usk, and to manufacture goods not dissimilar from those made by John Lysaght, Limited. The report recently issued by John Lysaght, Limited, showing their profits for the past year, has impressed a number of their competitors with the advantages which have accrued by erecting works at the seaboard.

Politics in the Implement Trade.

For some time past there have been many rumors as to difficulties in the Agricultural Implement "combine," and prophecies have been made that it was on the verge of a break up. The "combine" consists of two organizations, the one an association of Implement dealers, and the other an association of Implement makers. The Implement Dealers' Federation is composed of about 15 county associations, numbering altogether about 1000 members. The manufacturers who support the federation number about 150. The makers concerned have signed a federation agreement under which they undertake in certain counties to refuse trade terms to any but members of the Dealers' Federation. It is now publicly stated that one of the largest associations of local dealers (Wiltshire and Hampshire), with a membership of about 70, has seceded from the federation. A prominent member of the Worcestershire Chamber of Agriculture has recently received a letter from a firm of Implement makers who are stated to be among the largest makers of Plows in Great Britain. They still are nominally members of the federation, but on June 4 wrote the following letter to an agent who was outside the federation:

We are pleased to inform you that we believe that the days of the Implement Makers' Federation are numbered. Wilts and Hants have seceded, and other counties are about to follow. The harvesting section, who were the prime movers in, and the chief supporters of, the federation, have withdrawn their support, and intimated to their agents that they may sell at what price they choose. Of course, this action will break the backbone of the federation, which was formed to keep up selling prices and surreptitiously to crush out of existence small agents and small makers. We believe that the time has now come when we may again, if you are willing, resume our business relationships which were so ruthlessly suppressed by the tactics of the federation.

In view of the attempts which are being made from time to time by American Implement makers who are new to the British trade to push business over here, this information cannot fail to be of real importance.

Custom and Corruption.

The Hardware trade in this country is at the moment considering the Prevention of Corruption bill at present passing through Parliament. Clause 4 affects the retail ironmonger, inasmuch as it ignores "trade customs." One of the speakers at the Leeds Ironmongers' Association, held last week, cited an instance: A builder comes to an ironmonger for some Fire Places, Locks, &c., and is charged, say, 10 per cent. less than the general public—there is no harm in that, as everybody knows that the builder must make a profit to live. But suppose, as often happens, that the builder brings with him his client to choose the goods, and that the client requests the goods to be charged direct to him; in that case it is usual to credit the builder with his 10 per cent. on the transaction. By so doing no injury is done the client, as the ironmonger would not sell to him at the price charged to the builder, but under the bill an ironmonger would be unable to allow the builder anything without the express consent of his client. This would put the ironmonger in a very awkward position, for if he did not allow the builder what is justly his by custom the builder would be offended and might close his account, and it would be very awkward to have to ask the client's permission to pay the money, as the client might be a person who knew nothing about business, and who would probably consider that even 5 per cent. was an exorbitant commission, and that the ironmonger was charging the amount extra for the purpose of giving it to the builder.

Another criticism made upon the bill is that the Fifth Clause reverses the usual process of English law, in that the accused must prove his innocence instead of assuming that the accused is innocent until proved guilty. To be quite safe, it would be necessary for the ironmonger to obtain his client's written consent before paying any commission. It is felt that while legislation is urgently needed to prevent payment of bribes to buyers and others, yet the only safe way if the bill becomes law is to tell builders and agents that in no circumstances can any commission on goods sold be allowed unless the goods are charged to the builder's or agent's own account. The bill in its own way shows one of the many traditional difficulties which have grown up in an old established trade like that of ironmongery. If the ironmonger can shake himself free from a number of intermediaries who fatten upon him for discount and commissions, it is, I think, a great gain.

A Point Favoring America.

In connection with India trade, I would draw the special attention of those American exporters who are disposed to tender for Indian Governmental contracts to the advantageous position in which they find themselves. As a rule, the Secretary of State for India stipulates that European articles required by the Indian Government must be purchased through the Director-General's stores in London. Now, no doubt, this rule was intended to cover all articles manufactured outside of India, but it is at once evident that its wording does not cover goods of American origin, and hence it has been found convenient to purchase locally American made goods. Active agents for American firms are able to tender with full knowledge of the requirements, and to make such modifications as may be necessary on the spot, whereas the British manufacturer has merely the meager details

supplied from London, and has no opportunity of making personal investigation or inquiry.

Kermanshah.

I wonder how many readers of *The Iron Age* have ever heard of Kermanshah. I am free to confess that until the Bagdad Railroad scheme came into prominence I had never heard of it myself. Yet there is both a province and a city of Kermanshah, and both province and city, in case the Bagdad Railroad becomes an accomplished fact, are likely to prove of great commercial importance. With the economic development of Persia will come a struggle for commercial predominance as between Russia and Great Britain. In either event I apprehend alert American exporters can benefit. Proposals are being rained upon us for the development of this, that and the other district, city or port in Persia. The Karun River has been opened to trade; the caravan route from India into Seistan has been re-established; the Mishki Railroad is being constructed; the Lynch road northward from Ahwaz on the Karun is approaching completion. More important than these, it is proposed to open up the whole of Southern Baluchistan from the sea up to the Helmond River, and from India westward to Seistan and Persia. All these preparations and commercial movements indicate that this part of the country, which seems to have slept for centuries, is once again about to awaken. With the India Government operating from India westward; with the Germans obtaining a predominant influence in the Bagdad Railroad and operating eastward; with Great Britain's influence in the Persian Gulf and her heavy financial stake in the Suez Canal, it follows that great activity will be expected in this part of the country during the next 20 years. The Bagdad Railroad, among other results, will confer great importance upon both the province and the city of Kermanshah. The city of Kermanshah lies on the western side of Persia, not far from the frontier of Asia Minor, and less than 5 degrees due north of the Persian Gulf. It is almost equidistant between the Caspian Sea and the Persian Gulf, and at the present moment has caravan route connections with Teheran on the northeast, Kazbin on the north, Bagdad on the west and a number of other towns of some commercial importance. It stands on rolling ground connected with the hills of Fath Ali Khan, Chiasorkh and Kamazard.

The bazaars of the town from all accounts are spacious, although much narrower than those in Teheran, and are well stocked with all kinds of goods for everyday use. It is purely a mercantile trade, no curios being sold. It is difficult to form a correct estimate of the population of Kermanshah, but it is probably not far short of 60,000. There are about 200 merchants in the town, dealing mostly in Manchester goods obtained direct from Manchester, or through Bagdad. In addition there are about 20 Ottoman Jews, who have in their hands the greater part of the foreign import and export trade. The town, of course, lives on agriculture, the people being mainly engaged in tilling the fields. Wheat and barley used to be found in great abundance. The total output for the province in a normal year for grain of all kinds may be estimated at less than 70,000 tons. A traveler who has been there says of the city:

It stands in the very center of the richest grain country of Persia, and, perhaps, of the whole East, for the simple reason that among the mountains of Kurdistan the winter snows and spring rains are so plentiful as to preclude in most years the necessity of irrigation, which is a *sine qua non* in most parts of Mesopotamia and Persia. At the same time the mountains are not a hindrance to agriculture, because they form well defined ridges, between which the valleys are broad, level and exceedingly fertile. Where nature has been so liberal man has done nothing to reap the benefit, and communications are so deficient in Persia that it is impossible to get an abundance of grain, even to the comparatively local markets of Teheran on the one hand and of Bagdad on the other. When I was in Kermanshah the prospects of the coming harvest were so good that wheat was actually selling for 8 krans a kharvar and barley for 10 krans. [A kran is at present worth about 9 cents, and a kharvar is equal to 650 pounds.] A simple calculation, therefore, will show that the price of wheat was a little over 14 cents per hundredweight, and of barley just 18 cents per hundredweight. These figures are not unique, though they are certainly unusually low. At the same time the prices in Bagdad, only 220 miles away, were six times as great. At Sultanabad I found already a considerable difference, wheat fetching about 60 cents per hundredweight, while at Teheran the price was multiplied 12 times—that is to say, wheat and barley were standing at 12 tomans a kharvar ($2.16 a hundredweight).

Though Teheran is but 330 miles from Kermanshah, it costs at least 12 times what the grain is worth on the spot to transport it over that distance, for which a railway freight could not be more than 14 cents a hundredweight, or the equivalent of the local price, and might easily be a good deal less. It is not difficult, therefore, to understand that during the great famine in Teheran, when wheat had to be imported from Russia at enormous cost, the grain was actually lying rotting in the fields of Kurdistan. To add to the absurdity of the situation an embargo has been placed on the export of cereals, so that up to last year the Kermanshah farmers might not send their surplus to Bagdad, to which transport charges, though large enough, are, comparatively speaking, favorable.

It is evident, I think, from these comments of a trained observer that if transit facilities can be opened up by means of the Bagdad Railroad Kermanshah cannot fail to prove of great commercial importance. Preece, another traveler, writing in 1899, says:

There are but few towns in Persia which show today so flourishing a condition, from a trade point of view, as Kermanshah; and this in spite of oppression by the local Governor and badness and unsafety of the roads radiating from it. Kermanshah is the port of entry for all goods entering Persia from Bagdad coming from England and India via the Persian Gulf and the Tigris. It is practically the only route available for Western Persia, now that the Luristan Road can no longer be relied upon, supplying such districts as Kurdistan, Hamadan, Irak, and even competing seriously with the trade of the European merchants of Isfahan. At one time a certain portion of the trade filtered down from Tabriz, but now very little comes through that town. Such Russian goods, as Naphtha, Glassware and Hardware, as have a sale in the bazaars come via Hamadan and Resht.

Commercial Importance of Kermanshah.

D. Brown, who examined this district thoroughly in 1901 in the interests of the Bank of Persia, and who always took a conservative cautious point of view, says:

The commercial importance of Kermanshah has gradually developed since the opening of the Suez Canal, and is due to its being the frontier town on the trade route between Bagdad and Persia. The great drawback to this as a trade route is the delay which frequently takes place between Busreh and Bagdad, toward the end of the summer, owing to the shallowness of the river. This year the river is much lower than usual at this season, and vessels drawing more than 3½ feet of water cannot pass. Goods are already beginning to accumulate at Busreh, and considerable delays may be anticipated between now and the end of November.

Imports of Kermanshah.

I append herewith some particulars as to the imports into Kermanshah from March 21, 1901, to March 20, 1902:

Articles.	Imported from—	Quantity.	Value. Krans.
Wood, Corked.	Bagdad, batmans	120	150
Machinery and Tools,	Germany, batmans	355	5,749
Metals—			
Iron and Steel in bars,	United Kingdom, batmans	66,494	206,272
Tin Sheets,	United Kingdom, batmans	8,580	34,500
Zinc in bars,	United Kingdom, batmans	12,210	206,872
Copper Articles,	United Kingdom, batmans	620	5,080
Iron and Steel Articles,	United Kingdom, batmans	13,475	63,237
Copper Bars,	United Kingdom, batmans	17,290	196,903
Minerals,	United Kingdom, batmans	2,300	9,959
Furniture,	Austria-Hungary	....	2,410
Watches,	Switzerland, number	3	335
Glassware,	Austria-Hungary, batmans	1,521	15,351
Bicycle,	United Kingdom, number	1	900

The weight of a batman is 6½ pounds, and there are 11 krans to a dollar. I do not give these particulars of Kermanshah merely as a matter of academic interest, but because it is one of a number of other towns which are likely to be opened up in the near future, and the more completely acquainted American exporters become with the commercial possibilities of Asia Minor and Persia the better able will they be to cope with the trade of the district when inclination or necessity urges.

Arkansas Retail Hardware Dealers' Association.

OWING to the heavy pressure on our columns last week we were obliged to omit a part of the report of the annual meeting of the Arkansas Retail Hardware Dealers' Association, which accordingly we give herewith.

The Advantages of System in the Retail Store.

Frank B. Gregg of Little Rock read a paper relative to system in the retail store, as follows:

In this progressive age if we would be in the forefront we must first, last and always have an aim for organized work. The politician when he starts a campaign believes he can almost see the end from the beginning, because he has his forces well organized. All trusts and combines are conducted on the basis of united and systematic effort. Not only the large enterprises of the world, but the small ones that are successful prove to be so because monster minds have studied and worked out

J. F. MAXEY, President.

a system that lesser minds must execute. Despise not the day of small things, for from very small and seemingly insignificant beginnings have sprung the mammoth enterprises of the world. What is the solution of the question of marvelous growth as manifested in our postal service, banking, railroads, telegraph, telephone companies; in fact, business of all kinds? It may be summed up in one word—system.

THE OBJECT OF SYSTEM

is to facilitate work and save time and money, therefore when any system is so arranged that it creates more work and detail and adds to the expense of running a business it is a case of too much system. System is only good when it helps you accomplish the same or better results with less work than before. It is doing the right thing at the right time, and in a way that it will stay done. Get the thing done. The tag ends of unfinished business are time consumers; they drag on, they multiply, they take ten minutes to do if they are done to-day, two hours if they are done to-morrow. Get the thing done. Finish it. Keep your eyes off the clock. Keep your interest undivided. The new problem will be the more easily tackled when the old one is out of the way. System stands at the door and desires admittance to every interrupting detail. System sees that every facility is at hand, at the finger's end. System keeps things from you until you are ready for them. Create your system as you go along. When by no fault of yours a thing goes wrong it is a symptom that there is a lack of system. Sit down then and there and devise a system which will insure that that particular thing will never go wrong. Don't wait until to-morrow to devise the system: There is satisfaction and success in a finished article. There is danger and delay in even an unfinished detail. Proceed calmly, forcefully, quickly, but not hurriedly; get the thing done.

A BUSINESS RUN WITHOUT SYSTEM

reminds me of a wagon run without grease. It runs hard, wears the bearings, makes lots of noise, and sometimes gets a hot box and has to stop altogether. But a little oil of system applied judiciously to the right place stops all the trouble. But what would you think if a man had a wagon with a hot box and would commence rubbing grease on the wagon bead instead of on the axle? You would think that he did not know his business. Well, some merchants do just such foolish things, for when goods don't sell they jump on the salesmen instead of getting after the man who buys the goods that won't sell. But if they would just stop and think and apply a little of the oil of system to the buying of goods, the old wagon would move off as quickly and smoothly as an automobile with ball bearings and rubber tires. System is very necessary to know when to give it, where to apply it and size of the dose.

WHAT RETAIL HARDWARE DEALERS NEED

are systems that will help them buy the right goods at the right time, in the right quantities and at the right prices. Systems that will help them get their goods opened, checked and marked and put away, in such a way that they will be displayed to advantage, that the marks will stay on, and that the goods will not get damaged after reaching their proper place in stock. After getting a stock well bought, properly displayed, the Hardware man must think out all kinds of schemes for letting people know what he has to sell, what his prices are, what the good qualities of his wares are. He must make people think they need and must have his goods, and when you convince a man that he needs what you offer he will very soon find the means of possessing it. The dealer must think out the methods, the manners of serving his customers quickly and satisfactorily after they have been induced to come to his store, and right here let me say that the future trade of this new customer depends very largely on the treatment he receives on his first visit. Treat him right the first time and he is easier to sell to the second time. Treat him right the second time, and each succeeding time the same, and he will soon become one of your best advertisements.

AFTER GAINING CUSTOMERS

you must find a system for caring for the cash left by these customers. Systematic ways for looking into a man's standing before you grant him credit, and, which is much harder, systematic ways of collecting them when due. And very much of a man's success in running a store depends on how good a collector he is. Don't be afraid to ask for your money when it is due, or in letting a credit customer know that you will expect him to pay according to agreement, and always have some definite time agreed on for settlement. A few days ago I was talking to a Hardware dealer from another State and he gave me a little history of his business. He had been running a small hardware business successfully for a number of years, and finally, having other interests, he allowed the management of the Hardware store to fall into the hands of men who were working for a modern salary. The result was that the store gradually became a back number, trade was dull, business just about paying expenses for awhile, then finally losing money.

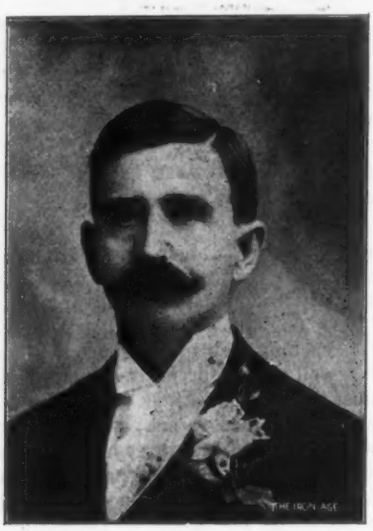
PREMIUMS ON SALES.

Realizing that he must do something to build up trade again, he decided to offer the salesmen premiums on their sales. The man showing the largest volume of business for the week he gave $1, and to the man showing the greatest percentage of increase over his sales for the

week before $1. Under this system you will see that it is possible for the best salesman to win both prizes, but at the same time the least favored man has a chance at the dollar on the percentage prize. This gentleman told me this simple little system, which cost him $2 for the week, changed his business from a losing to a profitable one in a very short time, and he is now considering giving his men a percentage of the profit as a means of spurring them toward getting more business. A man's capacity largely depends upon his ability to invent and use system. System saves time and labor and insures an accuracy and despatch. On these things a success of business largely depends. It should surely then need no argument to convince a man of its importance.

WITHOUT SYSTEM

a man must do a lot of work with little results, with system a little work with a lot of results. System is then the foundation of every business. It has placed the business institutions of America at the head of those of the world, has proven that without it advancement is neither certain nor long lived. Industries where system has been encouraged have advanced steadily, while others remained just where they were years ago, and what system has done for others it will do for us.



HAMP WILLIAMS, First Vice-President.

C. E. TAYLOR, Secretary-Treasurer.

Advertising.

The subject of aggressive advertising on the part of the retail Hardwareman having been introduced, Hamp Williams of Hot Springs spoke at some length. One method he had used was the circulation of calendars. These were furnished to him without charge by a Harvesting Machine manufacturing concern. He got up a card and put on one side his name and address and an enumeration of the lines handled by him. On the other side were printed the words, "This entitles you to one of our nice calendars." The people would come in after the calendars and he would have a chat with them if possible, treating them courteously, showing them around the store, &c. This year he distributed from 1500 to 2000 calendars, these going into as many homes. Many other people visit these homes and note what he handles in his store. The result has been that many have gone to his store and made purchases just from having seen the calendar. Mr. Williams also referred to a man that he had sent out to sell Mowing Machines, the manufacturers of the machines paying half the man's salary and expenses. This man was from his own town. By paying half the man's time and expenses Mr. Williams was permitted by the Harvesting Machine concern to use him for advertising his own business. He thought it better to have a man that knew the country and the people than to allow the manufacturers to send a man from their section who knew nothing about the country and people. His man would, of course, be able to talk to the people better and could make them feel that he would treat them right, he not being a stranger. Besides Harvesters and Mowing Machines, he would also sell such things as Cultivators, Wagons, Buggies, &c. He made it a point to get all the names possible over the entire territory by inquiring at the post offices, and found out whether the parties were good or bad and how they were getting along. If he meets a man that had once been trading with his employer but is not now, he proceeds to find out the trouble. He comes in and makes his report. He finds a man down in a certain place who once bought a Wagon from me, but is not trading with me now. He finds out just why. He gets him to come in. Mr. Williams' idea was that it was a good advertisement always to have satisfied customers. In his city he never advertised very much but advertised a great deal in the country newspapers; thought it brought good returns. For instance, if he sold a Harvesting machine to a farmer he would write his nearest newspaper and have it make some such mention of him as "See this progressive, enterprising farmer; he keeps up with the times. He bought a Harvesting Machine from Hamp Williams of Hot Springs." He advertised from week to week in this way. He made it a point to have the newspaper sent this party a copy of the paper. The farmer likes to see his name mentioned as being energetic and progressive.

R. F. Roys of Russellville stated that he had followed pretty much the same plan Mr. Williams followed. He said that whenever you get the people thinking you are after their business you will pretty nearly get some of it. He thought it important that you let the people know your name, who you are, and what kind of business you are in, and the way to do this is to advertise—*advertise*. One especially good advertisement is always to have what the people call for. Don't order goods in large quantities, but keep a good assortment, and when a customer comes in and calls for a certain thing you have it. He goes out and tells some one else where you can always find what you want. Get the people talking about you. Get your name before the people. The idea is, let them know you are in business and you have the goods to sell, and at the right price. Another thing is a good display of your goods. Have the stock neatly arranged and convenient, so that when a customer comes in and wants an article you can lay your hand on it. Make frequent changes in your stock so as to attract attention—make it look fresh. People like to go in such a place. One time he said he bought a lot of carpenters' aprons with his advertisement on them. He gave them away to carpenters. Of course many people read the advertisement. One day a carpenter came in and got an apron from me. He had never been trading with me. I got to talking with him. He says, "You handle Paint, Nails, &c.?" "Yes, yes; I handle everything like that." "Well," he says, "can you fill an order promptly?" "Yes, sir; I can do that." "Don't have to send off and get it?" He began to figure what he wanted and asked me if I could fill it right away.

I told him yes. The bill amounted to about $350. This advertisement on the apron brought in the customer. The apron cost me about 15 cents.

Mr. Corey said that sending out a card with your ad. on it and putting something of interest on the other side, like market reports, showing the condition of corn, cotton, wheat, &c., would be appreciated by the customer. One good way to advertise is to create a demand for something the people don't know about; another to fill the demand for something that is well known.

What Constitutes the Real Cost of Goods?

J. H. Morgan, Camden, read the following paper on "What Constitutes the Real Cost of Goods:"

Add to original purchase bill expense of their delivery in the store and you have what constitutes the real cost of goods. The expenses of selling, such as rent, clerk hire, insurance, taxes, &c., should not be added to the cost, but considered only in figuring the profit made in selling them, and this cannot be estimated, for it is governed largely by the order, system and economy that enter into the management of individual dealers.

Some lines of goods kept by all Hardware dealers, such as Stoves, Plows, Nails, Rope, &c., are sold at a nominal profit, and if to the original cost is added the expense of sale and delivery you would find them priced above their market value. Others are kept by dealers in general merchandise as leaders, and the competition is such that this class of goods is sold at a nominal profit.

The expense of sale as stated above is varied by individual management, and influenced also by local surroundings, and in summing up the cost of each article and the price it will bear a general estimate must be arrived at, and this is necessarily fixed by each individual dealer.

AMONG THE HARDWARE TRADE.

H. A. Olmsted & Son have succeeded D. Rodrick in the Hardware, Stove and Tinware and Paint and Oil business in Monterey, Cal.

W. F. Baughman of Ashley, Ind., has disposed of his Hardware stock to Frank Hoover, who continues at the old stand.

Chatfield & Buhrman, Texarkana, Ark., have incorporated their business under the style of Chatfield & Buhrman Hardware Company, with a capital stock of $100,000. They are wholesale and retail dealers in Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements, Sporting Goods, &c.

M. A. Walker has lately succeeded his father, James Walker, in the Shelf and Heavy Hardware, Agricultural Implement, Stove, Mill Supply, Harness and Wooden Ware business at Covington, Tenn.

Weaver-Raymond Hardware Company, Springfield, Mo., have been succeeded by Weaver Hardware Company, who will continue the wholesale and retail business in Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements, Sporting Goods, Paints and Oils, &c.

Geo. Stewart Hardware Company, Washington, Iowa, have been incorporated with a capital, fully paid in, of $15,000. The company handle Shelf and Heavy Hardware, Stoves, Tinware, Farming Implements, Sporting Goods, Paints and Oils, Plumbing Supplies, &c.

E. Bailey & Sons, Patchogue, N. Y., have incorporated under that style with a capital of $100,000. They handle Hardware, Lumber, Sash, Blinds, Doors, &c., and also have a planing and molding mill.

Hatchett-Da Camara Hardware Company have been organized to succeed W. P. Hatchett in the Hardware business at West Palm Beach, Fla. The company have been incorporated under the laws of Florida with a capital stock of $35,000, W. H. Hatchett being president, and W. H. Da Camara, secretary and treasurer. Mr. Da Camara will continue to manage the business, which position he has filled since the opening stock was bought two years ago. The firm's business has grown so far beyond their expectations that their present quarters in the Jefferson Block, where they have a store, 25 x 80 feet, with two warehouses in the rear, are taxed to their utmost capacity, so that they contemplate erecting a new building on a desirable corner lot recently purchased with that purpose in view.

The Monitor Steel Sash Lock.

The Champion Safety Lock Company, Cleveland, Ohio, have changed the name of their steel sash lock, recently put on the market, from Monarch to Monitor, there being another sash lock of that name on the market. There has been no change in the form or construction of the lock.

Hub Gauge No. 430.

The gauge shown herewith is for use in measuring the length of pulley hubs, wagon wheel hubs, thickness of

Hub Gauge No. 430.

iron plate through holes, &c. The gauge will measure all lengths to 7½ inches, and can be inserted through a ⅝-inch hole. The gauge is put on the market by the L. S. Starrett Company, Athol, Mass.; New York store, 123 Liberty street.

Hercules Belt Punch.

The Peck, Stow & Wilcox Company, Southington, Conn., and 27 Murray street, New York, have just put on the market the Hercules belt punch, for use on leather

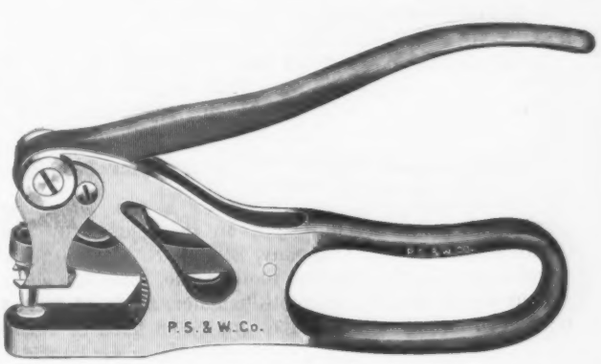


Fig. 1.—Hercules Belt Punch.

belting or belts of other materials or punching fabrics of any kind within the scope of such a punch, as shown in Fig. 1. It is made with a roll lever cam and possesses great punching power for heavy belting, &c. It is made in three styles—No. 4, japan finish; No. 6, half nickeled; and No. 7, full nickeled. A tube is furnished with the punch, but ten sizes are made, all of which are inter-

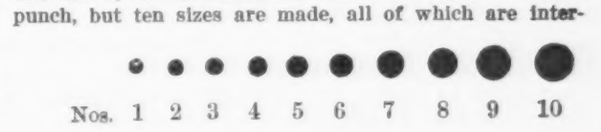


Fig. 2.—Sizes of the Interchangeable Tubes.

changeable, as shown in Fig. 2. One tube can be readily unscrewed from the head and any other size may be substituted. The punch complete with one tube can be retailed for about $1 each, extra tubes being furnished for about $1 per dozen additional. The punch is 6¼ inches long, strongly made and weighs 16 ounces.

Jacobs' Improved Drill Chuck.

A. I. Jacobs, Hartford, Conn., has put on the market the Jacobs improved drill chuck here shown, the illustration representing it full size for the chuck now ready,

Fig. 1.—Jacobs' Improved Drill Chuck.

taking shanks from 0 to 21-64 inch, is being the intention later to make both larger and smaller sizes. The predominating feature of this chuck is the convenient and effective method of inserting or removing drills or other tools quickly and easily. The toothed sleeve is readily turned backward or forward, thus gripping or releasing the tool held by the jaws, by means of the key, Fig. 2, without any tendency to revolve the spindle carrying the chuck, or compelling the mechanic to hold the belt in one hand while using the other manipulating the chuck. The key is 2½ inches long with a handle 3¾ inches, the diameter of the chuck being 1⅝ inches.

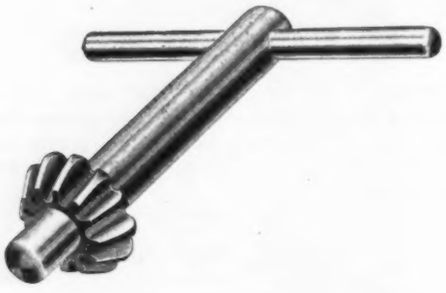
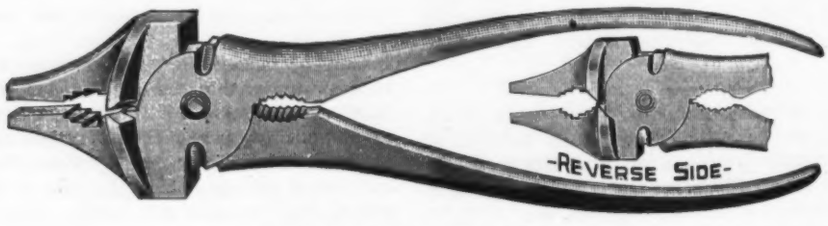


Fig. 2.—Toothed Key for Operating Chuck.

Cronk's Staple Puller Fencing Plier No. 20.

The accompanying cut represents a new improved staple puller fencing plier put on the market by the Cronk & Carrier Mfg. Company, Elmira, N. Y. The plier is referred to as having nine tools in one, being the same weight as the No. 1½ Maydole hammer, made of forged tool steel, and is warranted to cut No. 8 hard or No. 6 soft wire. In pulling staples, the staple is grappled just under the wire. The tool is made in 11-inch size.



Cronk's Staple Puller Fencing Plier No. 20.

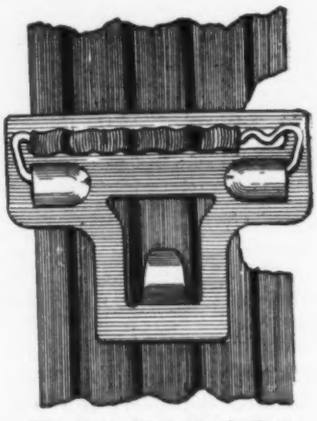
Acme Cast Iron Tank Heater.

The tank heater here illustrated is referred to as being comparatively large in size and as tall enough for use in a tank 2½ feet deep. The body is cast in one piece, thus avoiding any possibility of leakage at joints. The heater is provided with a basket grate, which lifts out with the top. It is pointed out that there is no chance for seepage of creosote, as the top is countersunk into the body. The heater can be used, it is explained, as a kettle for boiling soap or for other purposes. The tank is made in two weights, the heavier one being intended for use in steel tanks, as no rod is necessary to hold it down. The heater is offered by the Cedar Rapids Pump Company, Cedar Rapids, Iowa.

Acme Cast Iron Tank Heater.

The Boss Back Band Hook.

The accompanying cut represents a back band hook offered by the American Mfg. Company, Chattanooga, Tenn. It is made of sheet metal, with a crimped wire tongue in front of the opening. The bearings of the tongue are formed by pressing the metal upward. This construction leaves the rear face of the hook without any projections. The crimped wire is designed to enlarge its bearing within the folds of the band, so as to have a greater capacacity for all thicknesses of bands. It is explained that the tongue will hold a silk ribbon in the same way as the heaviest cotton band, that the tongue has no teeth to cut the webbing and that it is easily adjusted.



The Boss Back Band Hook.

T. V. Weinhold has recently succeeded W. H. Bishop in the Hardware business in Horton, Kan.

Current Hardware Prices.

REVISED JUNE 23, 1903.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓@33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued June, 1903, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Abrasives—

damite in Carloads:
Crystal ₱ ton $90@100
Grain ₱ ton $120@140
See also *Emery*.

Adjusters, Blind—

Dom.estic, ₱ doz. $3.00 33⅓&
North's 10%
Zimmerman's—See *Fasteners, Blind.*

Window Stop—

Ives' Patent 25&5%
Taplin's Perfection 25&5%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anvils—American—

Armand Hammer, Wrought ₱ lb 8½@8¾¢
Buel Patent Trenton ₱ lb 9½@9¾¢
Eagle Anvils ₱ lb 7¼@7¾¢
Hay-Budden, Wrought 9@9¼¢
Horseshoe brand, Wrought 9@9¼¢

Imported—

Peter Wright & Sons ₱ lb 10½¢

Anvil, Vise and Drill—

Millers Falls Co., $18.00 50&10%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Hull Bros. Co.:
Lots of 1 doz. 25%
Smaller Lots. 20%
Lots of 3 doz. 30%

Augers and Bits—

Com. Double Spur 70&10@75%
Boring Machine Augers 66⅔@70%
Car Bits, 12-in. twist 60@60&10%
Jennings' Pattern 50&10&5@60%
Ford's Auger and Car Bits 40%
Forstner Pat. Auger Bits 25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list 25&10%
No. 30. R. Jennings' List. 40&7½&10%
Russell Jennings 25&10&2½%
L'Hommedieu Car Bits 15&10%
Mayhew's Countersink Bits 45%
Millers' Falls 50&10&7½%
Pugh's Black 20%
Pugh's Jennings' Pattern 35%
Snell's Auger Bits 60%
Snell's Bell Hangers' Bits 50&10%
Snell's Car Bits, 12-in. twist 60%
Wright's Jennings Bits (R. Jennings' list) 50%

Bit Stock Drills—

See *Drills, Twist.*

Expansive Bits—

Clark's small, $18; large, $26 50&10%
Lavigne's Clark's Pattern, No. 1, ₱ doz., $26; No. 2, $18 50&10%
C. E. Jennings & Co., Steer's Pat. 25&10%
Swan's 60%

Gimlet Bits—

Common Double Cut, gro. $2.50@3.00
German Pattern, gro. $4.00@4.25

Hollow Augers—

Bonney Pattern, per doz. $11.00@11.50
Ames 25&10%
New Patent 25&10%
Universal 20%
Wood's Universal 25%

Ship Augers and Bits—

Ford's 40%
Snell's 40%
C. E. Jennings & Co.:
L'Hommedieu's 15&10%
Watrous' 33⅓&10%

Awl Hafts, See *Hafts, Awl.*

Awls—

Brad Awls:
Handled, gro. $2.75@3.00
Unhandled, Shouldered. gro. 63@66c
Unhandled, Patent, gro. 66@70¢
Peg Awls:
Unhandled, Patent, gro. $1@1.1c
Unhandled, Shouldered. gro. 65@70c
Scratch Awls:
Handled, Common, gro. $3.50@4.00
Handled, Socket, gro. $11.50@13.00
Hurwood 40%

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

First Quality, factory brands $5.50
First Quality, jobbers' brands $5.00@5.25
Second Quality $4.50@4.75

Axle Grease—See *Grease, Axle*

Axles—

Iron or Steel
Concord, Loose Collar 4½@5c
Concord, Solid Collar 5¼@5½c
No. 1 Common 3¾@4 c
No. 1½ Com. New Style 3¾@4 c
No. 2. Solid Collar 4¼@4½c
Nos. 11 to 14 60&10&10@70%
Nos. 15 to 18 ⅝
Nos. 19 to 22 70&10&5%
2% cash 10 days.

Boxes, Axle—

Common and Concord, not turned lb. 4½@4¾c
Common and Concord, turned lb. 5@5¼c
Half Patent lb. 9@9½c

Balances— Sash—

Caldwell new list 50%
Pullman's 60%

Spring—

Spring Balances 60@60&5%
Chatillon's:
Light Spg. Balances 40&10%
Straight Balances 40%
Circular Balances 50%
Large Dial 30%
Peiouze 50%

Barb Wire—See *Wire, Barb.*

Bars— Crow—

Steel Crowbars, 10 to 40 lb., per lb. 3@3½c

Towel—

No. 10 Ideal, Nickel Plate ₱ gro, $8.50
No. 20 Ideal, Brass Finish ₱ gro. $8.50

Baskets—

Hoffman's Brick Baskets each $3.25

Beams, Scale—

Scale Beams, List Jan. 12, '85 40&10%
Chattillon's No. 1 30%
Chattillon's No. 2 40%

Beaters— Egg—

Lightning Chain, ₱ doz, $1.15; ₱ gro. $12.00
National Mfg. Co.: ₱ gro.
No. 1 Dover, Family size $7.00
No. 2 Dover, Hotel size 14.00
Taplin Mfg. Co.: ₱ gro.
No. 60 Improved Dover 86.50
No. 75 Improved Dover 87.50
No. 75-2 Imp'd Dover, Tin'd 89.00
No. 100 Improved Dover 88.00
No. 102 Improved Dover, Tin'd 89.50
No. 150 Improved Dover, Hotel $15.00
No. 152 Imp'd Dover, Hotel, Tin'd $17.00
No. 200 Imp'd Dover Tumbler $9.00
No. 202, Imp'd Dover Tumbler Tin'd $10.00
No. 300, Imp'd Dover Mammoth, ₱ doz $37.00
Wonder (S. S. & Co.) ₱ gro. $6.00

Bellows—

Blacksmith, Standard List. 70@70&10%

Blacksmiths'—

Inch..	30	32	34	36	38	40
Each	$3.50	3.75	4.25	4.80	5.35	6.15

Extra Length:

Each	$4.00	4.55	5.10	5.60	6.40	7.50

Net Prices.

Molders—

Inch	9	10	11	12	13
Doz	$8.00	9.50	10.90	12.80	14.25

Hand—

Inch	6	7	8	9	10
Doz	$4.75	5.70	6.60	7.60	8.50

Bells— Cow—

Ordinary goods 75&25@75&10%
High grade 70&10@70&10&5%
Jersey 75&10%
Texas Star 50%

Door—

Abbe's Gong 45%
Barton Gong 55%
Home, R. & E. Mfg. Co.'s 55&10%
Lever and Pull, Sargent's 60&10&10%
Yankee Gong 55%

Hand—

Hand Bells, Polished 60&5@60&10%
White Metal 55@55&10%
Nickel Plated 50@50&5%
Swiss 60@60&7½%
Cone's Globe Hand Bells 33⅓&33⅓&10%
Silver Chime 33⅓&33⅓&10%

Miscellaneous—

Farm Bells lb. 2@2¼c
Steel Alloy Church and School 60%
American Tube & Stamp'g Co. Gongs 70%
Trip Gong Bells 55&10@60%

Belting— Rubber—

Agricultural (Low Grade) 75@75&5%
Common Standard 70@70&10%
Standard 65@70%
Extra 60&5@60&10%
High Grade 50&5@50&10%
Boston Belting Co.:
Seamless Stitched Imperial 45&5%
Boston 50&5%
Niagara 60&5%

Leather—

Extra Heavy, Short Lap 60@60&5%
Regular Short Lap 60&10@60&10&10%
Standard 70@70&5%
Light Standard 70&10%
Cut Leather Lacing 60&10%
Leather Lacing Sides, per sq. ft. 18c

Bench Stops—See *Stops, Bench*

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender 40%
Green River Tire Benders and Upsetters 20%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $30.50.

Bicycle Goods—

John S. Leng's Son's 1902 list:
Chain 50%
Parts 50%
Spokes 50%
Tubes 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks— Tackle—

Common Wooden 70@10@75&5%
Hollow Steel Blocks, with Ford's Patent Sheaves 50&10%
Lane's Patent Automatic Lock and Junior 30%
Stowell's Novelty, Mal. Iron 50&10%
See also *Machines, Hoisting.*

Boards Stove—

Zinc, Crystal, &c. 30@10@10&5%

Bolts—

Carriage, Machine &c.—

Common, list Feb. 1, '02 60@10@65&5%
Phila. Eagle, $3.00 list May 24, '99 80&50&5%
Bolt Ends, list Feb. 14, '95 65&5@65&10%
Machine, list Oct. 1, '99 65@65&5%
Machine with C & T. Nuts 60@2½@..%

NOTE.—*Jobbers are in many cases underselling the manufacturers.*

Door and Shutter—

Cast Iron Barrel, Round Brass Knob:

Inch	3	4	5	6	8
Per doz	$0.26	.30	.39	.47	.65

Cast Iron Spring Foot:

Inch	6	8	10
Per doz	$1.00	1.25	1.75

Cast Iron Chain, Flat, Japanned:

Inch	6	8	10
Per doz	$0.75	1.05	1.30

Cast Iron Shutter, Brass Knobs:

Inch	6	8	10
Per doz	$0.57	.80	1.00

Wrt Barrel, Jap'd 75&10@75&10&10%
Wrought Bronzed 40&5@50&10%
Wrought Flush, B. K. 50&10@60&10%
Wrought Shutter 40&10&10@60&5%
Wrought Square Neck 50@50&10%
Wrought Sunk, Flush 50@50&10%
Ives' Patent Door 60%

Stove and Plow—

Plow 60@60&5%
Stove 80@80&10%

Tire—

Common 72½@72½&10%
Norway Iron 80@80&5%
American Screw Company:
Norway Phila., list Oct. 16, '34 80%
Eagle Phila., list Oct. 16, '84 82½%
Bay State, list Dec. 28, '99 72½%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84 80%
Eagle Phila., list Oct. 16, '84 82½%
Eclipse, list Dec. 28, '99 72½%
Russell, Burdsall & Ward Bolt & Nut Co.
Empire, list Dec. 28, '99 72½%
Norway Phila., list Oct. '84 80%
Upson Nut Co.:
Tire Bolts 72½%

Borers, Tap—

Borers Tap, Ring, with Handle:

Inch	1¼	1½	1¾	2
Per doz	$4.30	5.00	5.75	7.25

Inch	2¼	2½
Per Doz	$8.65	11.50

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.65; No. 3, $2.50 each 25%

Boxes, Mitre—

C. E. Jennings & Co. 25&10%
Langdon 15&10%
Schatz 40%

Braces—

NOTE.—*Most Braces are sold at net prices.*
Common Ball, American $1.15@1.25
Barber's 50&10&10@60&10%
Fray's Genuine Spofford s 60%
Fray's No. 70 to 120, 81 to 123, 207 to 414 60%
C. E. Jennings & Co. 50&5&10%
Mayhew's Ratchet 60%
Mayhew's Quick Action Hay Patent 50%
Millers Falls Drill Braces 25&10%
P., S. & W. Co. Peck's Patent 60&10@65%

Brackets—

Wrought Steel 75@10@80%
Bradley's Wire Shelf:
Full cases 80&10&10%
Broken cases 80&10%
Griffin's Pressed Steel 80%
Griffin's Folding Brackets 70&10%

Bright Wire Goods—See *Wire and Wire Goods.*

Broilers—

Wire Goods Co. 75@75&10%

Buckets, Well and Fire—See *Pails*

Bucks Saw—

Hoosier ₱ gro. $36.00

Bull Rings—See *Rings, Bull.*

Butts— Brass—

Wrought list Sept., '96 30@30&5%
Cast Brass, Tiebout's 50%

Cast Iron—

Fast Joint, Broad 50@50&10%
Fast Joint, Narrow 50@50&10%
Loose Joint 70@5@70&10%
Loose Pin 70@5@70&10%
Mayer's Hinges 70@5@70&10%
Parliament Butts 70@5@70&10%

Wrought Steel—

Table and Back Flaps 75%
Narrow and Broad 75%
Inside Blind 75&10%
Loose Pin 75&10%
Loose Pin, Ball and Steeple Tip 60&5%
Japanned, Ball Tip Butts 70&10%
Bronzed Wrt. Nar. and Inside Blind Butts 55&10%

30 & 10% Extra

Cages, Bird—

Hendryx, Brass:
3000, 5000, 1100 series 5¢
1200 series 33⅓%
200, 300, 600 and 900 series 40&10%
Hendryx Bronze:
700, 800 series 40&10%
Hendryx Enameled 40&10%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong per lb. 4@4½¢
Sharp, 1 prong per lb. 4½@4½¢
Perkins' Blunt Toe ₱ lb 3½¢
Perkins' Sharp Toe ₱ lb 4 ¢

Cannons—

Breech Loading, 32 cal. Cartridge, Toy Cannons per doz. $2.00

Can Openers—See *Openers, Can*

Cans, Milk—

	5	8	10 gal.	
Illinois Pattern.	$1 50	2.00	2.25	each.
Iowa Pattern...	....	2.35	2.50	each.
	20	30	40	qts.
New York Patt'rn	1.65	2 40	2.75	each.
Baltimore Patt'rn	....	1.80	2.00	each.

Cans, Oil—

Buffalo Family Oil Cans:

3	5	10 gal.
$48.00	60.00	120.00 gro

Caps—Percussion—

Eley's E. B. 60c
G. D ..... *per M* 34@35c
F. L. ..... *per M* 40@45c
G. E ..... *per M* 50@57c
Musket ..... *per M* 62@63c

Primers—

Berdan Primers, $1.00 per M 5%
B. L. Caps (Sturtevant Shells) $1.00 per M 5%
All other primers per M.$1.22@$1.27

Cartridges—

Blank Cartridges:
22 C. F., $5 50 ..... 10c&5%
38 C. F., $7 00 ..... 10c&5%
22 cal. Rim, $1.50 ..... 1c&5%
32 cal. Rim, $2.75 ..... 10c&5%
B. B. Caps, Con. Ball Swgd. *$1.90*
B. B. Caps, Round Ball *$1.40*
Central Fire 25%
Target and Sporting Rifle ..... 15c&5%
Primed Shells and Bullets ..... 15c&10%
Rim Fire Sporting 50%
Rim Fire, Military ..... 15c&5%

Cases, Show—

Sun, No. 102, Silent Salesman, 6 ft., $25.00

Casters—

Bed ..... 70@70c&10%
Plate ..... 60@60c&5%
Philadelphia ..... 75@75c&10%
Boss ..... 70c&10%
Boss Anti-Friction ..... 70c&10%
Martin's Patent (Phœnix) 45%
Standard Ball Bearing 45%
Tucker's Patent low list 30%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Coil—

American Coil, Jobbers' Shipments:

3-16	*¼*	*5-16*	*⅜*	*7-16*	*½*	*9-16*
3.50	*6.00*	*4.30*	*4.00*	*3.80*	*3.70*	*3.65*
⅝	*¾*	*⅞*	*1 to 1¼ inch.*			
3.60	*3.55*	*3.50*	*3.40*	*per 100 lb.*		

German Coil ..... 60c&10c&10%

Halters and Ties—

Halter Chains ..... 60c&10@60c&10c&10%
German Halter Chains, list July 24, '97 ..... 60c&10c&10@70c&10%
Cow Ties ..... 60@60c&10%

Trace, Wagon, &c.—

Traces, Western Standard: 100 pair
6½—6-3, Straight, with ring *$26.00*
6½—6-2, Straight, with ring *$26.50*
6½—5-2, Straight, with ring *$30.00*
6½—10-2, Straight, with ring *$35.00*
Add 2¢ per pair for Hooks.
Twist Traces 2¢ per pair higher than Straight Link.
Trace, Wagon and Fancy Chains ..... 60@60c&10%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron ..... 60c&10@60c&10c&10%
Brass ..... 60c&10@60c&10c&10%
Safety Chain ..... 70c&10@75c&5%
Gal. Pump Chain ..... *lb.* 4½@4¾c
Covert Mfg. Co.
Breast ..... 40c&2%
Halter ..... 40c&2%
Heel ..... 40c&2%
Rein ..... 40c&2%
Stallion ..... 40c&2%
Covert Sad. Works:
Breast 70%
Halter 70%
Hold Back 70%
Rein 70%
Oneida Community:
Am. Coil and Halters ..... 40@45&5%
Am. Cow Ties ..... 45c&50%
Eureka Coil and Halter ..... 45c&50&5%
Niagara Coil and Halters ..... 45c&50&5%
Niagara Cow Ties ..... 45&5c&50&10&5%
Wire Dog Chains ..... 45c&50&5%
Wire Goods Co.:
Dog Chain ..... 70&10%
Universal Dbl-Jointed Chain 50%

Chalk—(From Jobbers.)

Carpenters' Blue ..... *gro.* 40c
Carpenters', Red ..... *gro.* 35c
Carpenters', White ..... *gro.* 30c
See also Crayons.

Checks, Door—

Bardsley's ..... 40&10%
Columbia ..... 50&10%
Eclipse 60%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools 55%
Youths' Chests, with Tools 40%
Gentlemens' Chests, with Tools 30%
Farmers', Carpenters', etc., Chests, with Tools 30%
Machinists' and Pipe Fitters' Chests, Empty 50%
C. E. Jennings & Co.'s Machinists' Tool Chests ..... 33⅓&10%

Chisels—Socket Framing and Firmer

Standard List ..... 70@70c&10%
Buck Bros 30%
Charles Buck 30%
C. E. Jennings & Co. Socket Firmer No. 10 ..... 60&10%
C. E. Jennings & Co. Socket Framing No. 15 ..... 60&10%
Swan's 70%
L. & I. J. White ..... 30@30&5%

Tanged—

Tanged Firmers ..... 40c&5@40&10%
Buck Bros 30%
Charles Buck 30%
C. E. Jennings & Co. Nos. 191, 181 ..... 16⅔&10%
L. & I. J. White, Tanged ..... 25&5%

Cold—

Cold Chisels, good quality.lb. 13@15c
Cold Chisels, fair quality..lb. 11@12c
Cold Chisels, ordinary ..... *lb. 8@9c*

Chucks—

Beach Pat., each $8.00,. ..... 35&5%
Pratt's Positive Drive 25%
Empire 25%
Blacksmiths' 25%
Skinner Patent Chucks:
Combination Lathe Chucks 40%
Drill Chucks, Patent and Standard 30%
Drill Chucks, New Model 25%
Independent Lathe Chucks 40%
Improved Planer Chucks 25%
Universal Lathe Chucks 40%
Face Plate Jaws 40%
Standard Tool Co.:
Improved Drill Chuck 45%
Union Mfg. Co.:
Combination 40%
Chair Drill 30%
Geared Scroll 30%
Independent 40%
Union Drill 30%
Universal 40%
Face Plate Jaws 35%
Wescott Patent Chucks:
Lathe Chucks 50%
Little Giant Auxiliary Drill 40%
Little Giant Double Grip Drill 40%
Little Giant Drill, Improved 40%
Oneida Drill 40%
Scroll Combination Lathe 40%

Clamps—

Adjustable, Hammers' ..... 20@20&5%
Cabinet, Sargent's ..... 50&10%
Carriage Makers', F. S. & W. Co. 50%
Carriage Makers' Sargent's 60%
Besly, Parallel ..... 33⅓&10%
Linemans, Utica Drop Forge & Tool Co 40%
Saw Clamps, see *Vises, Saw Filers'.*

Cleaners, Drain—

Iwan's Champion, Adjustable 55%
Iwan's Champion, Stationary 40%

Sidewalk—

Star Socket, All Steel .... ℔ doz. $4.05 net
Star Shank, All Steel .... ℔ doz. $3.24 net
W. & C. Shank, All steel, 7½ in. ℔ doz., $3.05; 8 in., $3.10; 8½ in., $3.25.

Cleavers, Butchers'—

Foster Bros. 30%
New Haven Edge Tool Co.'s 45%
Fayette R. Plumb ..... 33⅓&33⅓&10%
P., S & W ..... 50@50&5%
L. & I. J. White 30%

Clippers—

Chicago Flexible Shaft Company:
'98 Chicago Horse $8.75
1902 Chicago Horse $10.75
Lightning Belt $15.00
Chicago Belt $20.00
Stewart's Patent Sheep $18.50
} 15%

Clips Axle—

Eagle and Superior ¼ and 5-16 inch ..... 70c&10%
Norway, ¼ and 5-16 inch ..... 70@70c&10%

Cloth and Netting, Wire—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Compression and Plain Bibbs ..... 65c&5@65c&10%
Globe, Kerosene, Racking, &c., Cocks ..... 65c&10@70%

Coffee Mills—See *Mills, Coffee.*

Collars Dog—

Brass, Walter B. Stevens & Son's list. 40%
Embossed, Gilt, Walter B. Stevens & Son's list ..... 30&10%
Leatner, Walter B. Stevens & Son's list 40%

Combs Mane and Tail—

Covert's Saddlery Works ..... 60&10%

Compasses Dividers, &c.

Ordinary Goods ..... 75@75c&5%
Bemis & Call Hdw. & Tool Co.:
Dividers 65%
Calipers, Call's Patent Inside 55%
Calipers, Double 65%
Calipers, Inside or Outside 65%
Calipers, Wing 60%
Compasses 50%
J. Stevens A. & T. Co ..... 25&10%

Compressors Corn Shock—

J. B. Hughes' ℔ doz $2.50

Conductor Pipe, Galva.—

L. C. L. to Dealers:

Territory.	*Nested.*	*Not nested.*
Eastern	*7c&12½%*	*7c&1½%*
Central	*7c&7½%*	*7%*
Southern	*65c&10%*	*65c&5%*
S. Western	*65c&7½%*	*65c&2½%*

Terms, 2% for cash. With delivery on fast crates.
See also *Eave Troughs.*

Coolers, Water—

Gal. each.	2	3	4	6	8	
Labrador	$1.20	$1.50	$1.80	$2.10	2.70	
Gal.	3	4	6	8		
Iceland, ea.	$1.80	$2.10	$2.40	$3.00		
Gal.	2	3	4	6	8	
Galv. Lined Ea.	$1.85	$2.00	$2.25	$2.90	$3.90	25%

Ga.v. Lined side handles

Gal.	2	3	4	6	8	
Each.	$1.95	$2.15	$2.40	$3.30	$4.15	25%

Coopers' Tools—

See *Tools, Coopers'.*

Cord—Sash—

Braided, Drab ..... *lb.* 25c
Braided. White, Com .... *lb.* 17½@18c
Cable Laid Italian..lb. A, 18c; B, 16c
Common India ..... *lb 9 @9½c*
Cotton Sash Cord, Twisted ....13@16c
Patent Russia ..... *lb.* 12½@13c
Cable Laid Russia ..... *lb.* 13½@14c
India Hemp, Braided ..... *lb* 14@15c
India Hemp, Twisted ..... *lb.* 10@12c
Patent India, Twisted ..... *lb.10@12c*
Anniston Cordage Co.:
Old Glory, Nos. 7 to 12 ..... ℔ ⅏ 24 ¢
Anniston, Nos. 7 to 12 ..... ℔ ⅏ 19 ¢
Old Colony, Nos. 7 to 12 ..... ℔ ⅏ 18½¢
Anniston Drab, Nos. to 12 ..... ℔ ⅏ 24 ¢
Pearl Braided, cotton ..... ℔ ⅏ 17½¢
Massachusetts, White ..... ℔ ⅏ 22½¢
Massachusetts, Drab ..... ℔ ⅏ 26½¢
Eddystone Braided Cotton ..... ℔ ⅏ 19¢
Harmony Cable Laid Italian ..... ℔ ⅏ 18¢
Ossawan Mills:
Crown, Solid Braided White ... ℔ ⅏ 22¢
Braided, Giant, White ..... ℔ ⅏ 20¢
Peerless:
Cable Laid Italian ..... 16¢
Cable Laid Russian ..... 14¢
Cable Laid India ..... 12¢
Braided India ..... 18¢
Phœnix, White ..... 19¢
Samson, Nos. 7 to 12:
Braided, Drab Cotton ..... ℔ ⅏ 32½¢
Braided, Italian Hemp ..... ℔ ⅏ 32½¢
Braided, Linen ..... ℔ ⅏ 49¢
Braided, White Cotton, Spot. ℔ ⅏ 28½¢
No. 6 cords, 1¢ extra.
Silver Lake:
A quality, Drab, 40¢ 15%
A quality, White, 35¢ 15%
B quality, Drab, 35¢ 15%
B quality, White, 30¢ 15%
Italian Hemp, 40¢ 15%
Linen, 57½¢ 15%

Wire, Picture—

List Oct.,'00 ..... 85c&10@85c&10c&5%

Crackers, Nut—

Little Giant, ... ℔ gr. $24.00

Cradles—

Grain 50%

Crayons—

White Round Crayons, gross.5@5½c
Cases, 100 gro., $4.00, at factory.
D. M. Steward Mfg. Co.
Metal Workers' Crayons, gr. $2.50
Soapstone Pencils, round, flat or square ..... gr. $1.50
Rolling Mill Crayons ..... gr. $2.50
Railroad Crayons (composition) gr. $2.00
} Case lots 20%
See also *Chalk.*

Crooks, Shepherds'—

Fort Madison, Heavy ..... ℔ doz. $7.00
Fort Madison, Light ..... ℔ doz. $6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden 50%

Cutlery, Table—

International Silver Company:
No. 12 Medium Knives, 1847 .. ℔ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor ..... ℔ doz. $3.00
Wm. Rogers & Son ..... ℔ doz. $2 50
Simeon L. & Geo. H. Rogers Company:
12 dwt. Medium Knives ..... ℔ doz. $3.00
No. 77 Medium Knives ..... ℔ doz. $2.50

Cutters—Glass—

H. H. Mayhew Co 40%
Red Devil 50%
Smith & Hemenway Co 50%
Woodward 40%

Meat and Food—

Hale's..Nos. 11 & 111 12 & 112 13 & 113
Per doz... $8.00 10.75 14.50
American 30%

Nos.	1	2	3	4	5	
Each	$5	$7	$10	$25	$50	$60

Enterprise ..... 25@25&7½%

Nos.	10	12	22	32	
Each	$2	$3	$2.75	$4.50	$6

Dixon's, ℔ doz. ..... 30&10&40%

Nos.	1	2	3	4	
	$14.00	$17.00	$19.00	$30.00	

Home No. 1, ℔ doz. $22.75 ..... 50&10%
Little Giant, ℔ doz. ..... 33⅓&5&40%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

N. E Food Choppers 40%
Sterling ..... 40&40&10%

No. 1	$2.00 each	No. 2	$2.50 each

New Triumph No. 605, ℔ doz. $24.00 ..
30&10&40%
Woodruff's, ℔ doz ..... 30&10&40%

Nos.	100	150
	$15.00	$18.00

Enterprise Beef Shavers ..... 25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw, Corn Grater, &c 40%
Kraut Cutters 24 x 7, 36 x 8, 30 x 9 .. 55%
Kraut Cutters 36 x 12, 40 x 12 ..... 40%
Sterling, $6.00 each 33⅓%
Tucker & Dorsey Mfg. Co.:
Kraut Cutters 40%
Slaw Cutters, 1 Knife, ℔ gr. ... $18@$20
Slaw Cutters, 2 Knife, ℔ gr. ... $22@$36

Tobacco—

All Iron, Cheap ..... *doz. $4.25@$4.50*
Enterprise ..... 25&20%
National, ℔ doz. No. 1, $21; No. 2, $18.. 40%
Sargent's, ℔ doz., No. 2 ..... 60%
Sargent's No 12 and 21 ..... 60&10%

Washer—

Appleton's, ℔ doz. $16.00 ..... 50&10%
Bonney's 40%

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger ...per doz., $9.00
Iwan's Improved Post Hole Auger. 40&5%
Iwan's Vaughan Pattern Post Hole Augers, ℔ doz. $6.75
Iwan's Perfection Post Hole Digger, ℔ doz. $8.50
Iwan's Split Handle Post Hole Diggers, ℔ doz. $7.50
Kohler's Universal ..... ℔ doz. $15.00
Kohler's Little Giant ..... ℔ doz. $12.60
Kohler's Hercules ..... ℔ doz. $10.00
Kohler's Invincible ..... ℔ doz. $9 60
Kohler's Rival ..... ℔ doz. $8.50
Kohler's Pioneer ..... ℔ doz. $7.50
Never-Break Post Hole Diggers, ℔ doz. $24.00 ..... 60%
Samson, ℔ doz. $34.00 ..... 25%

Dividers—See *Compasses.*

Doors, Screen—

Phillips', style E, ¼ in. ..... ℔ doz. $10.80
Phillips', style 077, ½ in. ..... ℔ doz. $8.00
Phillips', style x-y, ⅝ in. ..... ℔ doz. $11.00
Porter's Plain, No. 6 ..... ℔ doz. $6 75
Porter's Ornamental, No. 20. ℔ doz. $10.50
Porter's No. 99 ..... $9.00
Porter's No. 44 ..... $10.75

Drawers, Money—

Sun Money Drawers, No. 5, ℔ doz. $9.50; No. 6, with Bell, $10.00; No. 6, with Gong, $10.50.
Tucker's Pat. Alarm Till No. 1, ℔ doz. $18; No. 2, $15; No. 3, $12; No. 4, $18.

Drawing Knives—

See *Knives, Drawing.*

Drills and Drill Stocks—

Common Blacksmiths' Drill..each $1.50@$1.75
Blacksmiths' Self-feeding, $3.75@5.00
Breast, Millers Falls ..... 15&10%
Breast, P., S. & W ..... 40&5%
Goodell Automatic Drills..40&5&40&10%
Johnson's Automatic Drills Nos. 2 and 3 ..... 16⅔&5&10%
Johnson's Drill Points ..... 16⅔&5&10%
Millers Falls Automatic Drills ..... 33⅓&10%
Ratchet, Curtis & Curtis 25%
Ratchet, Parker's 40%
Ratchet, Weston's 33⅓%
Ratchet, Whitney's, P. S. & W 50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00 ..... 33⅓%

Twist Drills—

Bit Stock ..... 60c&10@60c&10c&10%
Taper and Straight Shank ..... 60c&10@60c&10c&5%

Drivers Screw—

Screw Driver Bits..per doz. ..45@75c
Balsey's Screw Holder and Driver, ℔ doz. 2½-inch, $6; 4-in., $7.50 6-in., $9.. 40%
Buck Bros 30%
Buck Bros' Screw Driver Bits 30%
Champion 50%
Edson 60%
Fray's Hol. H'dle Sets, No. 3, $12.00 50%
Gay's Double Action Ratchet 35%
Goodell's Auto 50&10&10@50&10&10&5%
Hurwood 40%
Mayhew's Black Handle 50%
Mayhew's Monarch ..... 40&10%
Millers Falls, Nos. 20 and 21 ..... 25&10%
Millers Falls, Nos. 11, 12, 41, 42 ..... 15&10%
Never Turn 60%
New England Specialty Co 50%
Sargent & Co.'s:
Nos. 1, 50, 55 and 60 ..... 60%
Nos. 20 and 40 ..... 70%
Smith & Hemenway Co ..... 40&5%
Stanley's R. & L. Co.'s:
No. 64, Varnished Handles 30@60&10&10%
No. 80 ..... 70@70&10&10%
Swan's:
Nos. 65 to 68 ..... 50%
No. 40 ..... 40&10%
Nos. 25, 35 and 45 ..... 30&10&10%

Eave Trough, Galvanized

Territory.	*L. C. L.*	
Eastern	*7c*	*16⅔%*
Central	*7c*	*12½%*
Southern	*7c*	*2½%*
S. Western	*7c*	

Terms, 2% for cash.
See also *Conductor Pipe and Elbows.*

Elbows and Shoes—

Factory shipments 60%
Perfect Elbows (S. S. & Co.) 30%

Emery, Turkish—

	4 to 6	*5 to 10*	*5 to 15*	*Flour*
Kegs ..... *lb.*	*5c*	*5½c*	*3½c*	
½ Kegs ..... *lb.*	*5½c*	*5¾c*	*3¾c*	
Kegs ..... *lb*	*5c*	*6c*		
10-lb cans.10 in case.	*6½*	*7c*	*6c*	
10-lb. cans, less than 10.	*10c*	*10c*	*8c*	

NOTE.—*In lots 1 to 3 tons a discount of 10% is given.*

Extractors, Lemon Juice—See *Squeezers, Lemon.*

Fasteners, Blind—

Zimmerman's ..... 50&10%
Walling's 50%

Cord and Weight—

Ives 40%

Faucets—

Cork Lined ..... 50@50c&10%
Metallic Key, Leather Lined 70@70c&10%
Red Cedar ..... 40c&10@50%
Petroleum ..... 70c&5@75%
B. & L. B. Co.:
Metal Key ..... 60&10%
Star 60%
West Lock ..... 50&10%
John Sommer's Peerless Tin Key 40%
John Sommer's Boss Tin Key 50%
John Sommer's Victor Metal Key. 50&10%
John Sommer's Duplex Metal Key ... 60%
John Sommer's Diamond Lock 40%
John Sommer's I. X. L. Cork Lined .. 50%
John Sommer's Reliable Cork Lined 50&10%
John Sommer's Chicago Cork Lined .. 60%
John Sommer's O. K. Cork Lined 50%
John Sommer's No Brand, Cedar 50%
John Sommer's Perfection Cedar 40%
McKenna, Brass:
Burglar Proof, N. P 35%
Improved, ¾ and 1 inch 35%
Self Measuring:
Enterprise, ℔ doz. $30.00 ..... 40&10%
Lane's, ℔ doz. $36.00 ..... 40&10%
National Measuring, ℔ doz. $36.. 40&10%

Felloe Plates—

See *Plates, Felloe.*

Files—Domestic—

List revised Nov. 1, 1899.
Best Brands ..... 70c&5@70c&10c&5%
Standard Brands ..75c&5@75c&10c&10%
Second Quality ..... 5c&10c&10@80c&5%

Imported—

Stubs' Tapers, Stubs' list, July 24, '97 ..... 30%

Fixtures, Grindstone—

Net Prices:

Inch	*15*	*17*	*19*	*21*	*24*
Per doz.	*$2.60*	*2.75*	*3.00*	*3 50*	*4.50*

P., S. & W. Co ..... 30&10@40%
Reading Hardware Co 60%
Sargent's ..... 60&10&10%
Stowell's Giant Grindstone Hanger, ℔ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy ..... 50&10&10%
Stowell's Grindstone Fixtures Light... 60&10%

Fodder Squeezers—

See *Compressors.*

Forks—*Aug. 1, 1903, list.*

Hay, 2 tine.....67½
Hay 3 tine.....60&10%
Hay, 4 tine.....60&5%
Hay, Header and Bder 3 tine 60&15%
Hay, Header and Baler, 4 tine 60&5%
Grain or Barley.....70%
Manure, 4 tine.....60&20%
Manure, 5 and 6 tine....60&30%
Spading.....70&5%

Extra 50%

Iowa Dig-Easy Potato.....65%
Victor, Hay.....60&5%
Victor, Manure.....60%
Victor, Header.....60&5%
Champion, Hay.....60&5%
Champion, Manure.....60&20%
Columbia, Hay.....60&5%
Columbia, Manure.....70%
Columbia, Spading.....70&10%
Hawkeye Wood Barley 4 tine ₱ doz. $5.00; 6 tine, $6.00.
W. & C. Potato Digger.....65%
Acme Hay.....60&10&7½%
Acme Manure, 4 tine.....60&20&10%
Acme Manure, 6 tine.....60&5&10&2%
Dakota Header.....65&15&5%
Jackson Steel Barley.....65&15&5%
Kansas Header.....60&5%
W. & C. Favorite Wood Barley 4 tine, ₱ doz., $5.00; 6 tine, $6.00
Plated.—See *Spoons*.

Fountains, Stock—

Double Dewey.....₱ doz. $26.00

Frames—Saw—

Red, Polished and Varnished..doz. $1.15@$1.35
White.....*doz. 75@80c*

Freezers Ice Cream—

Qts...	*3*	*4*	*6*	*8*	*10*
Best..$1.45	*1.65*	*1.95*	*2.40*	*3.20*	*4.20*
Good $1.25	*1.40*	*1.70*	*2.15*	*2.75*	*3.75*
Fair..$1.00	*1.10*	*1.30*	*1.75*	*2.20*	*2.90*

Fruit and Jelly Presses—

See *Presses, Fruit and Jelly*.

Fry Pans—See *Pans, Fry.*

Fuse—

Per 1000 Feet.

Hemp Fuse.....*$2.60*
Cotton Fuse.....*2.90*
Single Taped Fuse.....*3.25*
Double Taped Fuse.....*4.20*
Triple Taped Fuse.....*5.00*

10&2½%

Gates, Molasses and Oil—

Stebbins' Pattern.....*80@80&10%*

Gauges—

Marking, Mortise, &c......*50&10@50&10&10%*
Chapin-Stephens Co.:
Marking, Mortise, etc..50&10@50&10&10%
Scholl's Patent.....50&10@50&10&10%
Door Hangers.....5@50&10%
Fulton's Butt Gauge.....30&10%
Stanley R. & L. Co.'s Butt & Rabbet Gauge.....20@20&10&10%
Wire, Brown & Sharpe's.....25%
Wire, Morse's.....25%
Wire P., S. & W. Co.....30&10%

Gimlets—Single Cut—

Nail, Metal, Assorted..gro. $1.40@1.60
Spike, Metal, Assorted gro. $2.80@3.25
Nail, Wood Handled, Assorted. gro. $1.75@2.00
Spike, Wood Handled, Assorted gro. $3.25@3.50

Glass, American Window

Jobbers' List, Dec. 16, 1902.
Single and Double:
From store, First Three Brackets..90@5%
From store, all sizes above....90@15%

Glasses, Level—

Chapin-Stephens Co....60@60&10@10&10%

Glue—Liquid, Fish—

List A, Bottles or Cans, with Brush. 37½@50%
*List B, Cans (½ pts., pts., qts)*33⅓@48%
List C, Cans (½ gal., gal.)....25@45%
International Glue Co. (Martin's).....40&10@50%

Grease, Axle—

Common Grade.....*gro. $5.00@6.00*
Dixon's Everlasting....10-₱ pails, ea. 85¢
Dixon's Everlasting, in bxs., ₱ doz. 1 ₱ $1.20; 2 ₱ $2.00

Griddles, Soapstone—

Pike Mfg. Co.....33⅓&33⅓&10%

Grindstones—

Bicycle Emery Grinder.....$6.50
Bicycle Grindstones, each.....$2.50@3.00
Pike Mfg. Co:
Improved Family Grindstones, per inch, per doz.....$2.00
Pike Mowe Knife and Tool Grinder, each.....$6.00
} 33⅓%
Velox Ball Bearing, mounted, Angle Iron Frames.....each, $3.25

Guards, Snow—

Cleveland Wire Spring Co.:
Galv. Steel ₱ 1000.....$9.00
Copper ₱ 1000.....$18.00

Halters and Ties—

Covert Mfg. Co.:
Web.....45&2%
Jute Rope.....40&5&2%
Sisal Rope.....20&2%
Covert's Saddlery Works:
Web and Leather Halters.....70%
Jute and Manila Rope Halters.....70%
Sisal Rope Halters.....60&20%
Jute, Manila and Cotton Rope Ties..70%
Sisal Rope Ties.....60&10%

Hammers—Handled Hammers—

Heller's Machinists'..40&10@40&10&10%
Heller's Farriers.....40&10@40&10&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75.....40@40&10&10%
Peck, Stow & Wilcox.....50%
Fayette R. Plumb:
Plumb, A. E. Nail..33⅓&7½@33⅓&10&7½%
Engineers' and B. S. Hand 50&7½&5@50&10&7½&5%
Machinists' Hammers50&5@50&10&5%
Riveting and Tinners'.....40&2½@40&10&2½%
Sargent's C. S. New List.....40%

Heavy Hammers and Sledges—

3 ₱. and under...lb. 4½c } 75@5@75
3 to 5 lb......*lb. 36c* } &10%
Over 5 lb......*lb. 30c* }
Wilkinson's Smiths'.....*9½c@10c lb.*

Handles—Agricultural Tool Handles—

Axe, Pick, &c......*45@50&5%*
Hoe, Rake, &c......*60@60&5%*
Fork, Shovel, Spade, &c.:
Long Handles.....*50%*
D Handles.....*50%*

Cross-Cut Saw Handles—

Atkins'.....40&5%
Champion.....45@45&10%
Disston's.....50%

Mechanics' Tool Handles—

Auger, assorted.....*gro. $2.30@$2.50*
Brad Awl.....*gro. $1.25@$1.50*
Chisel Handles:
Apple Tanged Firmer, gro. ass'd. $2.25@$2.35; large, $2.50@$2.60.
Hickory Tanged Firmer, gro. ass'd. $1.75@$2.20; large, $3.50@$3.70.
Apple Socket Firmer, gro. ass'd, $1.70@$1.85; large, $2.60@$2.25
Hickory Socket Firmer, gro. ass'd. $1.60 @ $1.75; large, $1.75 @ $2.00
Hickory Socket Framing,gro.ass'd. $2.50@$2.75; large, $2.65@$2.85
File, assorted.....*gro. $1.60@$1.15*
Hammer, Hatchet, Axe, &c......*50%*
Hand Saw, Varnished, doz. 70@75c
Not Varnished.....*55@60c*
Plane Handles:
Jack, doz.25c; Jack Bolted..55@60c
Fore, doz.35@38c; Fore, Bolted.. 70@75c
Chapin-Stephens Co.:
Carving Tool.....40@40&10%
Chisel.....65@65&10%
File and Awl.....65@65&10%
Saw and Plane.....40@40&10%
Screw Driver.....40@40&10%
Millers Falls Adj. and Ratchet Auger Handles.....15&10%
Nicholson Simplicity File Handle, ₱ gro.....$0.85@$1.50

Hangers—

Barn Door, New Pattern, Round Groove, Regular:

Inch.....	*3*	*4*	*5*	*6*	*8*
Single Doz.	*$0.85*	*1.20*	*1.50*	*1.90*	*2.30*

Barn Door, New England Pattern, Check Back, Regular:

Inch.....	*3*	*4*	*5*	*6*
Single Doz......	*$1.10*	*1.60*	*2.15*	*2.70*

Allith Mfg. Co.
Reliable.....per doz. $15.00
Chicago Spring Butt Co.:
Friction.....25%
Oscillating.....25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator.....40%
Railroad.....55%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60%
Roller Bearing.....60&10%
Lane Bros. Co.:
Parlor, Ball Bearing.....$4.15
Parlor, Standard.....$3.35
Parlor, New Model.....$2.85
Parlor, New Champion.....$2.25
Barn Door, Standard.5&10&10&5%
Covered.....50&10&10%
Special.....50&10&10&5%
Lawrence Bros.:
Advance.....40%
Cleveland.....60&10%
Crown.....60%
Giant.....50&10%
New York.....60%
Peerless.....60&10%
Sterling.....60%
Swing, No. 95.....50&10%
Union, No. 44, $5.00; No. 45 $7.00; No. 46, $9.00.
McKinney Mfg. Co.:
No. 1, Special, $15.....60&10%
No. 2, Standard, $18.....60&10%
Hinged Hangers, $16.....50%
Meyers' Stayon Hangers.50&10% (net)
C. S. Smith Mfg. Co.:
Lundy Parlor Door.....50&10%
Monarch Barn Door.....60&10%
Never Jump Hinge.....50&10%
Peerless.....60&10%
Perfection.....70&5%
Phœnix.....70&5%
Wagner's Adjustable.....70&10%
Warehouse Anti-Friction.....60%
Richards Mfg. Co.:
Pioneer Wood Track No. 8.....$2.25
Imp'd Wood Track No. 5.....$2.25
Imp'd Steel Track No. 7.....$2.70
Imp'd Steel Track No. 7.....$2.65
Ball B'r'g Steel Track No. 9.....$2.50
Ball B'r'g Steel Track No. 10.....$2.50
Roller B'r'g Steel Track No. 11.....$2.45
Roller B'r'g Steel Track No. 12.....$2.40
Ball B'r'g Steel Track No. 13.....$2.75
Roller B'r'g Steel Track No. 14.....$2.65
Ball B'r'g Trolley Track No. 15.....40%
Ball Brg Trolley Track No. 19.....40&5%
Ball Bearing Tandem Trolley Track No. 16.....40%
Silent Adjustable Track No. 18.....40%
Auto Adjustable Track No. 22.....40%
Trolley B. D. No. 17.....$1.60
Trolley F. D. No. 120.....$2.70
Trolley F. D. No. 121.....$2.85
Trolley F. D. No. 151.....$3.00
Roller Bearing D. D. No. 25.....70&5%
Roller Bearing U. S. B. D.....70&5%
Anti Friction B. D.....60&10%
Ives' Wood Track No. 1.....$2.15
Ives' Imp'd Wood Track No. 2..$2.15
Stowell Mfg. and Foundry Co.:
Acme Parlor Ball Bearing.....40%
Atlas.....60%
Badger Barn Door.....50%
Baggage Car Door.....50%
Climax Anti-Friction.....50%
Elevator.....40%
Express.....50%
Interstate.....60%
Lundy Parlor Door.....50%
Magic.....50%
Matchless.....60%
Nassau.....60&10%
Railroad.....50%
Street Car Door.....50%
Steel, Nos. 300, 401, 500.....40&15%
Stowell Parlor Door.....50%
Wild West, Nos. 300, 401, 500.....50%
Zenith for Wood Track.....50%
A. L. Swett Iron Works:
Eagle.....60&10%
Hylo.....50&10%
Perfection.....60%
Pilot.....50%
Taylor & Boggis Fy Co.50&15&10&5%
Wilcox Mfg. Co.:
Bike Roller Bearing.....60&10%
C. J. Roller Bearing.....60&10%
Cycle Ball Bearing.....50%
Dwarf Ball Bearing.....40%
Ives, Wood Track.....60&10%
L. T. Roller Bearing.....60&10&5%
New Era Roller Bearing.....30&10%
O. K. Roller Bearing.....60&10&5%
Prindle, Wood Track.....60%
Richards' Wood Track.....60%
Richards' Steel Track.....50&10%
Spencer Roller Bearing.....60&10%
Tandem Nos. 1 and 2.....60%
Underwriters' Roller Bearing.....40%
Velvet.....50%
Wilcox Auditorium Ball Bearing.30%
Wilcox Barn Trolley No. 123.....40%
WilcoxElv.Door,Nos 112and122&.50%
Wilcox Elv. Door, No. 132.....40%
Wilcox Fire Trolley, Roller Bearing.....30%
Wilcox Le Roy Noiseless Ball Bearing.....40%
Wilcox New Century.....50&10&10%
Wilcox O. K. Steel Track.....50%
Wilcox O. K. Trolley.....50%
Wilcox Trolley Ball Bearing....40%
Wilcox Wideman Narrow Gauge Ball Bearing.....40%
For Track, see *Rail*.

Extra 5&10% often given.

Hangers, Gate—

Myers' Patent Gate Hangers, ₱ doz., net, $4.50

Hasps—

McKinney's Perfect Hasp ₱ doz.....50%

Hatchets—

Best Brands.....*50@50&10%*
Cheaper Brands.....*10@60&10%*
Note.—Net prices often made.

Hinges—Blind and Shutter Hinges—

Surface Gravity Locking Blind: (Victor; National; 1893 O P Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No......	*1*	*3*	*5*
Doz. pair.....	*$0.85*	*1.75*	*3.50*

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No......	*1*	*1½*	*2*	*2½*
Doz. pair....	*$0.70*	*.65*	*.60*	*.55*

Mortise Reversible Shutter, (Buffalo, &c.)

No......	*1*	*1½*	*2*
Doz. pair....	*$0.75*	*.70*	*.65*

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Parker.....70@75%
Reading's Gravity.....75&10%
Sargent's, Nos. 1, 3, 5, 11 & 13 70&10@70&20%
Stanley's Steel Gravity Blind Hinges, ₱ doz. sets, without screws, $0.80; with screws, $1.15.
Wrightsville H'dware Co.:
O. S., Lull & Porter.....7 &5%
Acme, Lull & Porter.....75%
Queen City Reversible.....75%
Stenger's Positive Locking, Nos. 1 & 3.....70&10%
Shepard's Noiseless, Nos. 60, 65, 55... 70&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75%
1893, Old Pat'n, Nos. 1, 3 & 5.....75%
Tip Pat'n, Nos. 1, 3 & 5.....75%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....75%
Shepard's Double Locking, Nos. 20 & 25.....70%
Champion Gravity Locking, No. 75..75%
Steamboat Gravity Locking, No. 10.75%
Pioneer, Nos. 060, 45 & 5½.....75%
Empire, Nos. 101 & 103.....70%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60%

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No......	*1*	*2*	*3*
Hinges with Latches..$2.00		*2.70*	*5.00*
Hinges only.....	*$1.40*	*2.05*	*3.80*
Latches only.....	*.70*	*.70*	*.35*

New England:
With Latch.....*doz. ....@$2.50*
Without Latch....*doz. ....@$1.80*
Reversible Self-Closing:
With Latch.....*doz. ....@$1.80*
Without Latch.....*doz. ....@$1.45*
Western:
With Latch.....*doz. $1.80*
Without Latch.....*doz. $1.20*
Wrightsville H'dware Co.:
Shepard's or Clark's, doz. sets,

No.	1	2	3
Hinges with Latches	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	1.35

Spring Hinges—

Holdback, Cast Iron, gro. $9.50@10.50
Non-Holdback, Cast Iron gro $7@7.50
J. Bardsley
Bardsley's Patent Checking.....15%
Bommer Bros.:
Bommer Ball Bring Floor Hinges40%
Bommer Spring Hinges.....40%
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges.....50%
Chicago (Ball Bearing) Floor Hinge.....45%
Garden City Engine House.....25%
Keene's Saloon Door.....25%
Columbian Hdw. Co.:
Acme, Cast Steel.....30%
Acme, Brass.....20&5%
American.....30%
Columbia, No. 14.....₱ gr. $9.00
Columbia, No. 18.....₱ gr. $25.00
Columbia, Adjustable, No. 7, ₱ gr. $12.00
Gem, new list.....30%
Clover Leaf.....₱ gr. $12.50
Oxford, new list.....30%
Hoffman Hinge & Foundry Co.:
No. 70 & 80 Holdback Detachable$9.50
Lawson Mfg. Co.:
Matchless.....35%
Matchless Pivot.....45%
Shelby Spring Hinge Co.:
Crown Jamb Hinge.....40%
Chief Ball Bearing Floor Hinge.45%
Royal Ball Bearing Floor Hinge..45%
The Strover Mfg. Co.:
Ideal, No. 16, Detachable, ₱ gr$12.50
Ideal, No. 4.....₱ gr. $9.00
New Idea No. 1.....₱ gr. $9.00
New Idea, Double Acting.....45%

Regular discount on many lines 10% extra

Wrought Iron Hinges—

Strap and T Hinges, &c., list Mar. 15, 1901:
Light Strap Hinges.....*80@10%*
Heavy Strap Hinges 80@20@10%
Light T Hinges.....*75@10@5%*
Heavy T Hinges.....*75@5%*
Extra Heavy T Hinges..80@2½%
Hinge Hasps.....*70%*
Cor. Heavy Strap....*80@20@10%*
Cor. Ex. Heavy T.....*80@20%*

Extra 10@10@10%

Screw Hook and Strap. { *6 to 12 in*.....*lb. 3½c* / *14 to 20 in*.....*lb. 3½c* / *22 to 36 in*.....*lb. 3 c*

Screw Hook and Eye:
⅜ to 1 inch.....*lb. 6 c*
½-inch.....*lb. 7 c*
⅝-inch.....*lb. 9 c*

Miscellaneous—

Hoffman's Steel Spring Butt Hinges.....40&10%
Hoffman's Offset Refrigerator Hinges.....40&10%

Hitchers, Stall—

Covert Mfg. Co., Stall Hitchers.....25%

Hods, Coal—

	15	*16*	*17*	*18 inch.*
Galv. Open..	*$2.50*	*2.75*	*3.00*	*3.25* ₱ *doz.*
Jap. Open...	*$2.00*	*2.25*	*2.50*	*2.75* ₱ *doz.*
Galv. Funnel.	*$3.00*	*3.25*	*3.50*	*3.75* ₱ *doz.*
Jap. Funnel..	*$2.50*	*2.75*	*3.00*	*3.25* ₱ *doz.*

Masons, Etc.—

Cleveland Wire Spring Co.:
Steel Mortar.....each $1.45
Steel Brick.....each $1.10
Hoffman's:
Brick.....each $1.10
Masons'.....each $1.00
Plasterers'.....each $3.25

Hoes—Eye—

Scovil and Oval Pattern.....*60@10@60&10&10%*
Grub, list Feb. 23, 1899....*70@70&10%*

Handled—

Aug. 1, 1899, List:
Garden.....*70&10%*
Meadow & Rhode Island75@2½%
Southern Meadow...75@2½%
Mortar and Street.....*75@7½%*
Planters', Regular Pat'n.70&30%
Cotton.....*75@7½%*
Toy, Ladies', Boys', Onion, Turnip, Berry or Tobacco.70@10@5%

Extra 30%

Note.—Manufacturers and jobbers use a diversity of lists, and often sell at net prices.

Ft. Madison Cotton Hoe.....75&7½%
Ft. Madison Crescent Cultivator Hoe, per doz.....75&10%
Ft. Madison Mattock Hoes:
Regular Weight.....₱ doz. $5.00
Junior Size.....₱ doz. $4.00
Ft. Madison Sprouting Hoe, ₱ doz. $4.00
Ft. Madison Dixie Tobacco Hoe..75&20%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....60%
W. & C. Ivanhoe.....75&2%
B. B. Cultivator Hoe.....75&10&2%
Acme Weeding.....75&10&2%
W. & C. Lightning Shuffle Hoe, ₱ doz. $4.85

Hoisting Apparatus—

See *Machines, Hoisting*.

Holders—Bit—

Angular, ₱ doz. $24.00.....45&10%

Door—

Empire.....50%

File and Tool

Nicholson File Holders and File Handles.....33⅓%

Hooks—Cast Iron—

Bird Cage, Reading.....60%
Bird Cage, Sargent's List.....60%
Ceiling, Sargent's List.....40&10%
Clothes Line, Hoffman's.....40&10%
Clothes Line, Reading List.....65&10@65&10&10%
Clothes Line, Sargent's List..50&20&10%
Coat and Hat, Sargent's List.....45&10%
Clothes Line, Stowell's.....70%
Coat and Hat, Stowell's.....70%
Coat and Hat, Reading.....70@75%
Coat and Hat, Wrightsville.....65%
Harness, Hoffman.....per doz. 35@40c
Harness, Reading List.....70&10@75%

Wire—

Belt.....*80%*
Wire C. & H. Hooks....*60@10@10@70%*
Atlas, Coat and Hat:
Single Cases.....50%
10 Case Lots.....50&10%
Czar Harness.....50&10&5%

Wire Coat and Hat:
Acme....60%
B. B....60%
V Brace, Chief and Czar....60%
Gem....60%
Bright Wire Goods—See *Wire.*

Wrought Iron—

Box, 6 in., per doz. $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton....doz. $1.05@1.25
Wrought Staples, Hooks, &c.—
See *Wrought Goods.*

Miscellaneous—

Bush, Light, doz. $5.50; Medium, $6.00; Heavy, $6.50

Grass.....Nos.	*1*	*2*	*3*	*4*
Best....	*$1.50*	*1.75*	*2.00*	
Common....	*$1.30*	*1.50*	*1.60*	*1.60*

Potato and Manure....60%&20%
Whiffletree....lb. 5½c
Hooks and Eyes:
Brass....60c&10c@10@70%
Malleable Iron....70c&5@70c&10%
Covert Saddlery Works' Self Locking Gate and Door Hook....60%
Ft. Madison Cut-Easy Corn Hooks, ₱ doz. $3.25 net
Crown Picture....50&10%
Bench Hooks—See *Bench Stops.*
Corn Hooks—*See Knives, Corn.*

Horse Nails—See *Nails, Horse*

Horseshoes—

See *Shoes, Horse.*

Hose Rubber—

Garden Hose, ¾-inch:
Competition....ft. 4¼@ 4¾c
3-ply Standard.... ft. 6 @ 6½c
4-ply Standard....ft. 7½@ 8 c
5-ply extra....ft. 8½@ 9 c
4-ply extra....ft. 10½@11 c
Cotton Garden, ¾-in., coupled:
Low Grade....ft. 6 @7 c
Fair quality....ft. 8 @9 c

Irons—Sad—

From 4 to 10....lb 2¾@3c
B. B. Sad Irons....lb. 3@3¼c
Chinese Laundry....lb. 4¾@5c
Chinese Sad....lb. 3¾@4c
Mrs. Potts', per set:

Nos....	*50*	*55*	*60*	*65*
Jap'd Tops....	*74c*	*71c*	*84c*	*81c*
Tin'd Tops....	*77c*	*74c*	*87c*	*84c*

New England Pressing, lb....3½@3¾c

Pinking—

Pinking Irons....doz. 50@60c

Soldering—

Soldering Coppers 2½ and 3.. 21@22
1¼ and 2....23@25c
Covert Mfg. Co....20&2%

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw....30&5%
Steel....45&2%
Covert's Saddlery Works':
Daisy....60&10%
Victor....60&10%
Lockport....50%
Lane's Steel....30&10%

Kettles—

Brass, Spun, Plain....20@25%
Enameled and Cast Iron—See *Ware, Hollow.*

Knives—

Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c....30%
Hartzell Cutlery Co....50%
Smith & Hemenway Co....40&10%
Hay and Straw—See *Hay Knives.*

Corn—

Withington Acme, ₱ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—

Standard List....70&5@70c&10%
Bradley's....4
C. E. Jennings & Co. Nos. 45, 46..60&10%
Jennings & Griffin, Nos. 51, 52, 60&10&10%
Swan's....70&10&2½%
Watrous....16⅔&10%
L. & I. J. White....20&5@25%

Hay and Straw—

Lightning....₱ doz. $6.50@7.00
Iwan's Sickle Edge....₱ doz. $10.00
Iwan's Serrated....₱ doz. $10.00
Maine....₱ doz. $8.50

Mincing—

Buffalo....₱ gro. $13.00

Miscellaneous—

Farriers'....doz. $2.00@3.00
Woestenhoim's....₱ doz. $3.00@3.25

Knobs—

Base, 2¼-inch, Birch, or Maple, Rubber tip, gro....$1.10@1.20
Carriage, Jap, all sizes..gro. 25@30c
Door, Mineral....doz. 65@70c
Door, Por. Jap'd....doz. 70@75c
Door, Por. Nickel....doz. $2.05@2.15
Bardsley's Wood Door, Shutter, &c..15%
Picture, Sargent's....60&10%

Lacing Leather—

See *Belting Leather—*

Ladders Step Etc.—

Lane's Store....25%
Myers Noiseless Store Ladders....30%

Ladles—Melting—

L. & G. Mfg. Co....25%
P. S. & W....50%
Reading....60%
Sargent's....45&10%

Lanterns—Tubular—

Regular Tubular No. 0..doz. $4.35@4.75
Lift Tubular..No. 0..doz. $4.75@5.25
Hinge Tubular..No. 0..doz. $4.75@5.25
Other Styles....10c@10@10c&5%

Bull's Eye Police—

No. 1, 2¾ inch....$2.50@2.75
No. 2, 3 inch....$2.75@3.00

Latches—Gate—

Hoffman's Safety Gate....₱ doz. 60c

Thumb—

Roggin's Latches, with screw..dz 35@40c

Leaders. Cattle—

Small....doz. 55c; large, 60c
Covert Mfg. Co....45&2%

Lifters, Transom—

R & E....33⅓%

Lines—

Wire Clothes, Nos...	*18*	*19*	*20*
100 feet....	*$2.20*	*2.00*	*1.65*
75 feet....	*$1.80*	*1.70*	*1.30*

Ossawan Mills.
Crown Solid Braided Chalk....33⅓%
Mason's, No. 0 to No. 5....33⅓%
Samson Cordage Works:
Solid Braided Chalk, No. 0 to 3....40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ₱ gr....30%
Anniston Waterproof Clothes, 50 lt., ₱ gro.: $22.00; Gilt Edge, $20.00; Air Line $20.00; Acme, $15.00; Alabama, $15.00; Empire, $13.50; Advance, $13.50; Alliston, $11.50; Calhoun, $10.00; Oriole, $20.00; Albermarle, $25.50; Eclipse, $11.00; Chicago, $10.00; Standard, $9.00; Columbia, $8.00.

Locks—Cabinet—

Cabinet Locks....33⅓@33⅓&c7½%

Door Locks, Latches, &c.—

[Net prices are very often made on these goods.]
Reading Hardware Co....50%
R. & E. Mfg. Co....40%
Sargent & Co....40@40&10%

Elevator—

Stowell's....40%

Padlocks—

Wrought Iron....75c@10c&5@80c&5%
R. & E. Mfg. Co. Wrt. Steel and Brass....75@75&10%

Sash, &c.—

Ives' Patent.:
Bronze and Brass....55&7½%
Crescent....50%
Iron....60&2½%
Wrought Bronze and Brass....50&5%
Wrought Steel....55%
Reading....60c&10&10@70%

Machines—Boring—

Com., Upright, Without Augers..$2.00
Com., Angular, Without Augers..$2.25
Without Augers.

R. & E. Mfg. Co.:	Upright.	Angular.
Improved No. 3.	$4.25	No. 1 $5.00
Improved No. 4.	3.75	No. 2. 3.38
Improved No. 5.	2.75	
Jennings'...No. 4,	3.15	No. 1, 3.50
Millers' Falls.......		5.75
Snell's, Rice's Pat.	2.50	2.75

Hoisting—

Moore's Anti-Friction Differential Pulley Block....30%
Moore's Hand Hoist, with Lock Brake, 20%
Moore's Portable Pneumatic Hoist....25%

Ice Cutting—

Chandler's....15&10%

Washing—

Boss Washing Machine Co.:	Per doz.
Boss No. 1; Boss Rotary....	$57.00
Boss No. 7; Dietz Rotary....	60.00
Champion Rotary; Banner No. 1..	54.00
Standard Champion No. 1....	48.00
Standard Perfection....	36.00
Cinti Square Western....	30.00
Uneeda American, Round....	29.00

Mallets—

Hickory....45&5@50%
Lignumvitæ....45c&5@50%
Tinners', Hickory and Applewood, doz....30@35c

Mats—Door—

Elastic Steel (W. G. Co.)....10%

Mattocks—

See *Picks and Mattocks.*

Menders Hose

Robinson's Hose Menders....₱ gro, $2.00

Milk Cans—See *Cans, Milk*

Mills—Coffee, etc.—

Enterprise Mfg. Co....25@30%
Hoffman's Side, Coffee and Spice....₱ doz. $1.25
National, list Jan. 1, '94....30%
Parker's Columbia & Victoria..50&10@60%
Parker's Box and Side....50&10@60%
Sun, No. 108, 1 ℔ mill....₱ doz, $8.00
Swift, Lane Bros Co....30%

Mowers, Lawn—

Net prices are generally quoted.
Cheap....all sizes. $1.90@1.95
Good....all sizes, $2.25@2.50

	10	*12*	*14*	*16-inch*
High Grade	*4.25*	*4.50*	*4.75*	*5.00*

Continental....60&10%
Great American....7 %
Great American Ball Bearing....60&10%
Quaker City....70%
Pennsylvania....60&10%
Pennsylvania Ball Bearing....60&5%
Pennsylvania Golf....50%
Pennsylvania Horse....%
Pennsylvania Pony....45%
Philadelphia:
Styles M., S., C., K., T....70&10%
Style A, all Steel....60&10%
Style E, High Wheel....70&10&5%
Drexel and Gold Coin, low list...50&5%

Nails—

Cut and Wire. See Trade Report.
Wire Nails and Brads, Papered.
List July 20, 1899. .85c&10c@10@90%
Hungarian, Finishing, Upholsterers', &c. See Tacks.

Horse—

Nos.	6	7	8	9	10	
A. C....	25¢	23¢	22¢	21¢	21¢....	40&5%
Ausable....	28¢	26¢	25¢	24¢	23¢.	50&10%
C. B. K....	25¢	25¢	22¢	21¢	21¢....	40%
Champ'n	28¢	26¢	25¢	24¢	23¢	40&10&5%
Clinton...	19¢	17¢	16¢	15¢	14¢	30&10&5%
Maud S....	25¢	28¢	22¢	21¢	21¢....	50%
Putnam..	23¢	21¢	20¢	19¢	18¢....	33⅓%
Putnam						
Cold Rol'd	19¢	18¢	17¢	16¢	.. ....	10&10%
American, Nos. 5 to 10	₱ ℔					9@9½¢
Nonpareil	Nos. 5 to 10¢	₱ ℔	12¢			
Jobbers' special brands...per lb. 8@9c						

Picture

	1¼	*2*	*2¼*	*3*	*3½ in.*
Brass Head..	*.45*	*.60*	*.70*	*.95*	*1.00 gro.*
Por. Head...	*..*	*1.10*	*1.10*	*1.10*	*.. gro.*

Crown Picture Nails....₱ gro. $1.50

Nippers, See *Pliers and Nippers.*

Nuts—

Cold Punched: Off list.
Mfrs. or U. S. Standard.
Square, plain....$4.50
Hexagon, plain....$4.60
Square, C. T. & R....$4.70
Hexagon, C. T. & R....$5.00
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square Blank....$4.80
Hexagon Blank....$5.00
Square Tapped....$4.60
Hexagon Tapped....$4.80

Oakum—

Best or Government....lb. 6¼c
Navy....lb. 4¾c
U. S. Navy....lb. 5¼c
Plumbers' Spun Oakum....2¾c
In carload lots ¼c lb. off f.o b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—

Brass and Copper....65@65&10%
Tin or Steel....70c&10@75%
Zinc....75@75&10%
Chase, or Paragon:
Brass and Copper....60&10@65%
Tin or Steel....75@75&10%
Zinc....76@70&10%
Malleable, Hammers' Improved, No. 1, $3.60; No. 2, $4; No. 3, $4.40 ₱ doz. 20%
Malleable, Hammers' Old Pattern, same list....50&10%
American Tube & Stamping Co.:
Spring Bottom Cans....70&10&10%
Railroad Oilers etc....60@60&10%

Openers—Can—

French....doz. 35c
Iron Handle....doz. 25@27c
Sprague, Iron Hdle..per doz. 35@40c
Sardine Scissors...doz. $1.75@$3.00
Marvel....per doz. $1.25
National....50%
Stowell's....per doz. 35@45¢
Tip Top....per doz. $0.75

Egg—

Nickel Plate....per doz., $2.25
Silver Plate....per doz., $3.50

Packing—

Asbestos Packing, Wick and Rope, 15@15½c lb.

Rubber—

Sheet, C. I....8@12c
Sheet, C. O. S....9@13c
Sheet, C. B. S....10@14c
Sheet, Pure Gum....50@70c
Sheet, Red....35@40c
Jenkins' Standard, ₱ ℔ 80¢....25@25&5%

Miscellaneous—

American Packing....7@10c lb.
Cotton Packing....15@14c lb.
Italian Packing....9@12½c lb.
Jute....3½@4c lb.
Russia Packing....7@11c lb.

Pails—Creamery

S. S. & Co., with gauges.. No 1 $6.25; No. 2, $5.50 ₱ doz.

Galvanized—

Price per doz.

Quart....	*10*	*12*	*14*
Water, Regular..	*1.50*	*1.75*	*2.00*
Water, Heavy....	*2.75*	*3.00*	*3.25*
Fire, Rd. Bottom.	*2.30*	*2.60*	*2.80*
Well....	*2.25*	*2.50*	*2.75*

Pans—Dripping—

Standard List....60c&5@60&10%

Fry—

Common Lipped:

No.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.95*	*1.05*	*1.15*	*1.30*	*1.65*

Roasting and Baking—

Regal, S. S. & Co., ₱ doz., Nos. 5, $4.50; 10 $5.25; 20, $5.75; 30, $6.25.
Simplex, ₱ doz.:

No.	40	50	60	140	150	160
	$2.75	3.25	3.75	3.00	3.25	4.00

Paper—Building Paper—

Asbestos:	*lb.*
Building Felt....	*2¾c*
Mill Board, sheet, 40 x 40 inches	*3½c*
Mill Board, roll, thicker than 1-16 inch....	*3¾c*
Mill Board, roll, 1-16 in. thick and less....	*2¼c*

	Per roll
Rosin Sized Sheathing:	*500 sq. ft.*
Light wt., 25 lbs. to roll...	*$0.45@0.50*
Medium wt., 30 lbs. to roll...	*$0.58@0.55*
Heavy wt., 40 lbs. to roll...	*$0.68@0.75*
Black Water Proof Sheathing, 500 Sq. ft., 1 ply, 65c; 2 ply, 85c; 3 ply, $1.10; 4 ply, $1.25.	
Deafening Felt, 9, 6 and 4½ sq. ft. to lb., ton....	*$45.00*
Red Rope Roofing, 250 sq. feet per roll....	*$1.65*

NOTE.—*These goods are often sold at delivered prices.*

Tarred Paper.

1 ply (roll 300 sq.ft.), ton..$32.50@35.00
2 ply, roll 108 sq. ft....60@65c
3 ply, roll 108 sq. ft....82@87c
Slater's Felt (roll 500 sq. ft.)....75c
NOTE.—*Above prices often include delivery.*
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.)....$2.75

Sand and Emery—

Flint....60@60c10%
Garnet....25@20@15%

Parers—Apple—

Advance....₱ doz. $4.50
Baldwin....₱ doz. $5.00
Bonanza Improved....each $6.50
Dandy....each $7.50
Eureka Improved....each $20.00
Family Bay State....₱ doz. $15.00
Improved Bay State....₱ doz. $36.00
New Lightning....₱ doz. $7.50
Reading 72....₱ doz. $4.00
Reading 78....₱ doz. $7.00
Turn Table '98....₱ doz. $6.75
White Mountain....₱ doz. $6.00

Potato—

Saratoga....₱ doz. $7.00
White Mountain....₱ doz. $6.00

Paris Green—

Less than 1 ton,	*per lb.*
Arsenic kegs or casks....	*12½c*
Kegs, 100 to 175 lbs....	*13 c*
Kits, 14, 28, 56 lbs....	*14 c*
Paper boxes, 2 to 5 lbs....	*14 c*
Paper boxes, 1 lb....	*14½c*
Paper boxes, ½ lb....	*15 c*
Paper boxes, ¼ lb....	*16 c*

1 to 5 tons, 1 cent per lb. less; 5 tons and over, 1½ cents per lb. less.

Picks and Mattocks—

List Feb. 23, 1899....65c&10@70%

Pinking Irons—

See *Irons, Pinking.*

Pins—Escutcheon—

Brass....60@60&10%
Iron, list Nov. 11, '85... ...60@60&10%

Pipe, Cast Iron Soil—

Standard, 2-6 in....50&10%
Extra Heavy, 2-6 in....65%
Fittings....70%

Pipe, Merchant,

Steel or Iron, Carload Lots, f.o.b, Pittsburgh.

Merchant Pipe.	*Black.*	*Galvanized.*
⅛, ¼, ⅜ inch....	*68%*	*58%*
½-inch....	*70%*	*60%*
¾ to 6 inch....	*75%*	*65%*
7 to 12 inch....	*69%*	*59%*

Less than carloads, 12½% advance.

Pipe Sewer—

Jobbers' Prices—
Standard Pipe and Fittings, 2 to 24 in.
New England....70%
New York and New Jersey....75%
Maryland, Delaware, East Penn. 75%
West Penn and West Va....76%
Virginia....78%
Ohio, Michigan and Ky....78%
Carload lots are generally delivered.

Pipe, Stove—

Edwards' Nested Stove Pipe:

	C. L.	L. C. L.
5 in., per 100 joints	$7.50	$8.50
6 in., per 100 joints	8.00	9.00
7 in., per 100 joints	9.00	10.00

Planes and Plane Irons—

Wood Planes—

Bench, First quality....40c&5@40c10%
Bench, Second qual....50c&5@50c10%
Molding....33⅓c&5@33⅓c10%
Bailey's (Stanley R. & L. Co) 5&10@25&10&10%
Chapin-Stephens Co.:
Bench, First Quality....40@40&10%
Bench, Second Quality....50@50&10%
Molding....33⅓@33⅓&10%
Toy and German....40@40&10%
Gage Self Setting....35%
Union....60%

Iron Planes—

Bailey's (Stanley R. & L. Co)....25&10@25&10&10%
Chaplin's Iron Planes....50&10%
Miscellaneous Planes (Stanley R. & L. Co.)....20&10@20&10&10%
Sargent's....60%
Union....60%

Plane Irons—

Wood Bench Plane Irons....30c&5@30c10%
Buck Bros....30%
Chapin-Stephens Co....30@30&10%
Stanley R. & L. Co...20&10@20&10&10%
L. & I. J. White....20&5@25%

Planters, Corn, Hand.

Kobler's Eclipse....₱ doz. $8.50

Plates—

Felloe....lb. 3¼@4c
Self-Sealing Pie Plates (S. S. & Co.), ₱ doz. $2.00....50%

Pliers and Nippers—

Button Pliers....75@75&10%
Gas Burner, per doz., 5 in., $1.15@ $1.30; 6 in., $1.35@$1.45

Gas Pipe..	*7*	*8*	*10*	*12-in.*
	$1.75	*$2.00*	*$2.75*	*$3.75*

Acme Nippers....50@50&5%
Bernard's:
Parallel, Pliers....95%
Paragon Pliers....50&5%
Lodi Pliers....50&5%
Elm City Fence Pliers....35%
Cronk & Carrier Mfg. Co.:
American Button....75&10%
Cronk's....60%
Improved Button....70&10%
Stub's Pattern....50%
Combination and others....33⅓%
Heller's Farriers' Nippers, Pincers and Tools 40&10@40&10&10%.
P., S. & W. Tinners' Cutting Nippers, 30@30&10%.
Swedish Side, End and Diagonal Cutting Pliers....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds....40%

Plumbs and Levels—

Chapin Stephens Co.:
Plumbs and Levels....30@30&10&10%
Chapin's Imp. Brass Cor. 4½@40&10&10%
Pocket Levels....80@80&10&10%
Level Glasses....60@60&10&10%
Disston's Plumbs and Levels....70%
Disston's Pocket Levels....70%
C. E. Jennings & Co.'s Iron....25&10%
C. E. Jennings & Co.'s Iron, Adjustable, 33⅓&10%
Stanley R. & L. Co....30&10@30&10&10%

Stanley's Duplex.....20@20&10@10%
Woods' Extension.....33⅓%

Poachers, Egg—

Buffalo Steam Egg Poachers, ₱ doz., No. 1, $4.0; No. 2, $.00; No. 3, $.00; No. 4, $12..0.....50%

Points, Glaziers'—

Bulk and 1 lb. papers.. lb. 8½c@..
½-lb. papers..... lb. 9½c@..
¼-lb. papers..... lb. 9½c@..

Pokes, Animal—

Ft. Madison Hawkeye.....₱ doz. $3.25
Ft. Madison Western.....₱ doz. $4.00

Police Goods—

Manufacturers' Lists.....25@25&5%
Tower's.....25%

Polish—Metal—

Prestoline Liquid, No. 1 (½ pt.), ₱ doz. $4.00; No. 2 (1 qt.), $9.72.....40%
Prestoline Paste.....40&10%
George William Coffman:
U. S. Metal Polish Paste, 3 oz. boxes, ₱ doz. 50¢; ₱ gr. $4.50; ½ lb boxes, ₱ doz. $1.25; 1 lb boxes, ₱ doz. $2.25.
U. S. Liquid, 8 oz. cans, ₱ doz. $1.25; ₱ gr. $12.00.
Barkeepers' Friend Metal Polish, ₱ doz. $1.75; ₱ gr. $18.00.
Wynn's White Silk, ½ pt. cans, ₱ doz.....$2.00

Stove—

Black Eagle Benzine Paste, 5 lb cans.. ₱ lb 10¢
Black Eagle, Liquid, ½ pt. cans ₱ doz. 75¢
Black Jack Paste, ¾ lb cans, ₱ gro. $9.00
Ladd's Black Beauty, gr. $10.00.....50%
Joseph Dixon's, ₱ gr. $5.75.....10%
Dixon's Plumbago.....₱ lb 8¢
Fireside.....₱ gr. $2.50
Gem, ₱ gr. $4.50.....10%
Japanese.....₱ gr. $3.50
Jet Black.....₱ gr. $3.50
Peerless Iron Enamel, ½ pt. cans..... ₱ doz. $1.50
Wynn's:
Black Silk, 5 lb pail.....each 70¢
Black Silk, ½ lb box.....₱ doz. $1.00
Black Silk, 5 oz. box.....₱ doz. $0.75
Black Silk, ½ pt. liq.....₱ doz. $1.00

Poppers, Corn—

1 qt., Square.....gro. *$9.00*
1 qt., Round.....gro. *$10.00*
1½ qt. Square.....gro. *11.00*
2 qt., Square.....gro. *13.00*

Post Hole and Tree Augers and Diggers—

see also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6 4 ft., 48¢.
Steel Hitching Posts, each.....$1.30

Potato Parers—

See *Parers, Potato.*

Pots— Glue—

Enameled.....40%
Tinned.....35%

Powder—

In Canisters:
Duck, 1 lb. each.....45¢
Fine Sporting, 1 lb. each.....75¢
Rifle, ½-lb. each.....15¢
Rifle, 1-lb. each.....25¢
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case (24 1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50

King's Smokeless:	Shot Gun	Rifle
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb cans bulk)	7.25	8.75

Robin Hood Shot Gun.....50&20%

Presses—Fruit and Jelly—

Enterprise Mfg. Co.....20@25%
Sensible.....33⅓%
2 qt., $2.00; 4 qt., $4.00; 10 qt., $6.00 each.

Seal Presses—

Morrill's No. 1, per doz. $20.00.....50%
Morrill's No. 2, per doz. $22.50.....50%

Pruning Hooks and Shears—See *Shears.*

Pullers Nail—

Cyclops.....50%
Miller's Falls, No. 3, per doz. $12.00.....33⅓&10%
Pearson No. 1, Cyclone Spike Puller, each $37.50.....50%
Pelican, ₱ doz. $9.00.....40&10%
Scranton, Case Lots:
No. 1 (large), ₱ doz. $6.50; No. 2 (large), $5.75; No. 3 (small), $5.00; No. 2-B (large), $5.50; No. 3-B (small), $5.00; No. 2-D (large), $4.50; No. 3-D (small) $4.00.
Smith & Hemenway Co.:
Alax.....60%
Diamond B, No. 2, case lots, ₱ doz $6.00
Diamond B, No. 2, case lots, ₱ doz $5.50
Eureka.....50%
Giant, No. 1, ₱ doz. $18; No. 2, $16.50; No. 3, $15.....40%
Yankee.....60%&5%

Pulleys—Single Wheel—

Inch.....	*2*	*2½*	*3*
Awning..doz	$0.55	.85	1.15

Hay Fork, Swivel or Solid Eye.....
doz., 4 in., $1.15; 5 in., $1.40

Inch.....	*2*	*2¼*	*2½*
Hot House.doz	$0.70	.90	1.35

Inch.....	*1¾*	*1½*	*1¾*	*2*
Screw....doz	$0.16	.19	.23	.30

Inch.....	*1¾*	*2*	*2¼*	*2½*
Side.....doz	$0.39	.49	.55	.63

Inch.....	*1½*	*1¾*	*2*	*2½*
Tackle....doz	$0.30	.42	.58	1.00

Stowell's:
Ceiling or End, Anti-Friction.....60%
Dumb Waiter, Anti-Friction...60&10%
Hay Fork, Anti-Friction, 5-in. Wheel, ₱ doz. $12.00.....50%
Electric Light.....60%
Side, Anti-Friction.....50&10%

Sash Pulleys—

Common Frame; Square or Round End, per doz., 1¾ in., 13c.; 2 in., 16c
Auger Mortise, no Face Plate, per doz. 1¾ in., 12c.; 2 in., 15c.
Auger Mortise, with Face Plate, per doz., 1¾ in., 13c.; 2 in., 15½c.
Acme.....1¾ in., 16¢; 2 in., 19¢
Common Sense, 1¾ in... ₱ doz., 18¢; 2 in., 20¢.
Fox-All-Steel, Nos. 3 and 7, 2 in. ₱ doz 25¢
Grand Rapids All Steel Noiseless...50%
Ideal No. 13.....1¾ in., ₱ doz., 16¢
Niagara.....1¾ in., 16¢; 2 in., 19¢
No. 26, Troy....1¾ in., 14½¢; 2 in., 16½¢
Star.....1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See *Blocks.*

Pumps—

Cistern.....60@60&10%
Pitcher Spout.....75&10@80%
Wood.....50@50&10%
Pump Leathers, Lower and Plunger Valves—Per gro.:

Inch..	*2*	*2¼*	*2½*	*2¾*
	$2.20	*2.50*	*2.75*	*3.00*

Inch..	*3*	*3¼*	*3½*	*3¾*	*4*
	$3.20	*3.60*	*3.85*	*4.10*	*4.50*

Barnes Dbl. Acting (low list).....50%
Contractors' Rubber Diaphragm No. 2 R. & L. Block Co.....$16.00
Flint & Walling's Fast Mail (low list)..55%
Flint & Walling's Pitcher Spout.....75%
Loud's Suction Pumps, U. S. Co.....20%
Myer's Pumps, low list.....50%
Myers' Power Pumps.....50%
Daisy Spray Pump.....₱ doz. $7.50
Myers' Spray Pumps.....50&10%

Punches—

Saddlers' or Drive, good..doz. 65@70c
Spring, single tube, good quality... *$1.75@2.00*
Revolving (4 tubes)...doz. $3.75@4.00
Bemis & Call Co.'s Cast Steel Drive....50%
Bemis & Call Co.'s Check.....55%
Bemis & Call Co.'s Spring.....50%
Morrill's No. 1 (A.B.C.), ₱ doz., $15.00..30%
No. 2, ₱ doz. $22.50.....50%
No. 2, Metal, ₱ doz., $45.00.....50%
Bench Punch, each, $40.00.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Steel Screw, B & K. Mfg. Co.....40%
Tinners' Hollow, P., S. & W. Co.35@35&5%
Tinners' Solid, P., S. & W. Co., ₱ doz., $1.44.....60%

Rail— Barn Door, &c.—

Cast Iron, Barn Door: Flange Screw Holes for Rd. Groove Wheels:

½	⅝	¾	*In.*
$1.70	*$2.10*	*$3.00*	*100 feet.*

Angular for Sq. Groove Wheels:

Small	*Med.*	*Large.*	
$1.60	*1.95*	*2.70*	*100 feet.*

Sliding Door, Brnzed Wr't Iron, ft.6½c
Sliding Door, Iron Painted....3½@3c
Sliding Door, Wrought Brass, 1⅛ in.....lb.30c..30%
Allith Mfg. Co. Reliable Hanger Track ₱ foot.....10¢
Cronk's Double Braced Steel Rail, ₱ foot.....3½¢
Cronk's O. N. T. Rail.....3½¢
Lanes' O. N. T., ₱ 100 ft., 1 inch, $3.10; 1¼ inch, $4.90; 1½ inch, $4.85.
Lanes' Standard, ₱ 100 ft.....3.75
Lawrence Bros.'.....₱ ft. 4½¢
Lawrence Bros. New York.....3½¢
McKinney's Hinged Hanger Rail ₱ foot, 11c.....50%
McKinney's None Better.....₱ ft. 3½¢
McKinney's Standard.....₱ ft. 4 c
Myers' Stayon Track.....50&10%
Smith's Wrought Bracket, Plain.....3½¢
Smith's Special.....4½¢
Smith's Never Jump, per ft. 11¢.....50%
Smith's Plain Steel.....30%
Smith's Milled Steel.....4½¢
Stowell's Cast Rail.....1½¢
Stowell's Steel Rail, Plain.....25%
Stowell's Wrought Bracket, Plain....3½¢
Swett's Hylo, per ft. 11¢.....50&10%
Swett's P. L. B. Steel Rail, ₱ 100 ft. $3.00

Rakes—

Net Prices, Mailable Rakes:

	10	*12*	*14*	*16-tooth*
Shank.....	*$1.50*	*1.60*	*1.75*	*1.85*
Socket.....	*$1.65*	*1.80*	*1.95*	*2.10*

Steel. August 1, 1899, List...70c&5c&20%
Malleable.....70¢&10@75¢&5%
Lawn Rakes, Metal Head, per doz.,
20 teeth.....*$3.25@3.50*
24 teeth.....*$3.60@3.75*
Fort Madison Red Head Lawn.....$3.25
Fort Madison Blue Head Lawn.....$3.00
Jackson Lawn, 29 and 30 teeth, ₱ doz $4.00
Kohler's:
Lawn Queen, 20-tooth, ₱ doz.....$3.45
Lawn Queen, 24-tooth, ₱ doz.....$3.60
Paragon, 20 tooth, ₱ doz.....$2.75
Paragon, 24-tooth, ₱ doz.....$3.00
Steel Garden, 14-tooth, ₱ doz.....$2.88
Malleable Garden, 14-tooth, ₱ doz..$2.00

Rasps, Horse—

Disston's.....75%
Heller Bros.....70&5@70&10x5%
McCaffrey's American Standard..... 60&10&5%
New Nicholson.....10&10%
see also *Files.*

Razors—

Borsalic.....60 & 10%
Fox Razors, No. 42, .. ₱ doz. $30.00 } 40%
Fox Razors, No. 44, .. ₱ doz. $20.00 }
Fox Razors, No. 8, Platina, ₱ doz. $25.00 } 40 & 10%
Red Devil.....60%
Silberstein:
Carbo Magnetic.....$18.00
Griffon, No. 65.....$15.00
Griffon, No. 00.....$12.00
All other Razors.....40%
Safety Razors.....30%

Safety Razors—

New Gem, in Tin Boxes.....₱ doz. $12.00
New Gem, Extra Blades.....₱ doz. $8.35
Gem Outfits (Razor, Strop, etc.)..... ₱ doz. $ 5.60
Complete Razor, extra Blade in Leather Case.....₱ doz. $27.00

Reels— Fishing—

Bishop's Independent Fish Reel Spooler, ₱ doz.....$30.00
Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, 4008, Silver Rubber Popolo, Nickeled Popolo, Aluminum, German Silver, Bronze, 3 04 N, 6 N, 4 N to 8 PN.....33⅓%
6 RW, 102 P and RN, 202 P and PN.40%
G 9.....20%
24 N to 28 PN.....35&10&10%
124 N, 974 PN, 002304 PN, 1020 R and PRN, 202 PR and PRN...50&5%
2304 N.....40&10&5%
5009 PN and N.....50%
2004 P.....50&10&5%
2904 PN.....60%
0924 N.....40&10%
02084 N.....45&12½&5%
Single Action Trout.....40&10%
986 P N 802 and 802 N.....50&10%
Competitor, 304 and 304 PN.....35%
00304 P and PN.....40&5%
Safety an i Salmon.....30%

Registers—*List Sept. 2, 1901.*

Black Jap.....
White Jap.....
Bronzed.....
Nickel Plated.....
Electro Plated.....
} *15&10 @80%*

There is a good deal of irregularity in prices of Registers.

Registers, Cash—

Sun, No. 11, Metal Cabinet.....$30.00
Sun, No. 10, Wood Cabinet.....$25.00

Revolvers—

Single Action.....85@90c
Double Act n, except 44 cal..$1.50@1.60
Double Action, 44 caliber...$1.75@1.95
Automatic.....$3.25@3.50
Hammerless.....$3.75@4.10

Riddles, Hardware Grade

16 in., per doz.....*$2.75@3.00*
17 in., per doz.....*$3.00@3.25*
18 in., per doz.....*$3.25@3.50*

Rings and Ringers—Bull Rings—

	2	*2½*	*3 Inch.*
Steel.....	*$0.70*	*0.75*	*0.80 doz.*
Copper.....	*1.00*	*1.10*	*1.35 doz.*

Hog Rings and Ringers—

Hill's Rings....gro. boxes, $4.25@4.50
Hill's Ringers, Gray Iron. doz. 55@60c
Hill's Ringers, Mal. Iron, doz. 75@80c
Blair's Rings.....per gro. $5.00@5.25
Blair's Ringers...per doz. $0.60@ .65
Brown's Rings....per gro. $5.50@5.75
Brown's Ringers..per doz. $0.75@1.00

Rivets and Burrs—

Copper.....50¢10@50¢10¢5%
Iron or Steel:
Tinners'.....75@75¢10%
Miscellaneous.....75@75¢10%

Rollers—

Acme, Stowell's Anti-Friction.....50%
Barn Door, Sargent's list.....60%
Cronk's Stay.....60&5%
Cronk's Brinkerhoff.....60%
Lane's Stay.....33⅓&5%
Stowell's Barn Door Stay.....₱ doz. $1.25

Rope—

Manila, 7-16 in. and larger, tarred or untarred...lb. 11 @12 c
Manila, ⅜-inch.....lb. 11½@12½c
Manila, ¼ & 5-16 in... lb. 12½@13 c
Manila, Hay, Hide and Bale Ropes, Medium and Coarse.....lb. 12 @12½c
Sisal, 7-16 in. and larger lb. 9 @10 c
Sisal, ⅜-inch " . lb. 9½@10½c
Sisal, ¼ and 5-16 inch..lb. 10 @11 c
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse.....lb. 9 @10 c
Sisal, Tarred, Medium Lath Yarn.....lb. 8½@ 9½c
Cotton Rope:
Best " ½-in. and larger, lb. 13½c
Medium, ¼-in. and larger, lb. 11 c
Com ....¼-in. and larger, lb. 9 c
Jute Rope:
Thread No. 1, ¼-in. and up, lb. 6½c
Thread No. 2, ¼-in. and up, lb. 6 c
Yarn, ¼-in. and up.. lb. 5 @5½c
Old Colony Manila Transmission Rope, ₱ lb 17½¢

Wire Rope—

Galvanized.....40¢5%
Plain.....45¢5%

Ropes, Hammocks—

Covert Mfg. Co.:
Jute.....40&5%
Sisal.....30%
Covert Saddlery Works.....60&5%

Rules—

Boxwood.....60&10@60¢10¢5%
Ivory.....35¢10@35¢10¢5%
Chapin-Stephens Co.:
Boxwood.....60@60&10%
Ivory.....35@35&10&10%
Miscellaneous.....50@50&10&10%
Combination.....55@55&10%
Stationers'.....10@10&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....60&10%
Stanley R. & L. Co.:
Boxwood.....60@60&10%
Ivory.....35@35&10&10%
Tyson Nut Co.:
Boxwood.....60@60&10%
Ivory.....35@35&10&10%

Sash Locks—See *Locks, Sash.*

Sash Weights—

See *Weights, Sash.*

Sausage Stuffers or Fillers—see *Stuffers or Fillers, Sausage.*

Saw Frames—See *Frames, Saw*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—

Atkins:
Circular.....50@50&10%
Band.....50&10@60%
Cross Cuts.....35&5%
Mulay, Mill and Drag.....50&10%
One-Man Saw.....40%
Wood Saws.....40%
Hand, compass, &c.....40%
Chapin-Stephens Co.:
Turning Saws and Frames...30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws.....25%
Disston's:
Circular, Solid and Inserted Tooth..30%
Band, 3 to 14 in. wide.....0%
Band, ½ to 2¾.....70%
Crosscuts.....45%
Narrow Crosscuts.....50%
Mulay, Mill and Drag.....50%
Framed Woodsaws.....35%
Woodsaw Blades.....35%
Woodsaw Rods.....25%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 75, 77, 8.....25%
Hand Saws, Nos 7, 107, 107½, 3, 1, 0, 00, Combination.....30%
Compass, Keynole, &c.....25%
Butcher Saws and Blades.....35%
C. E. Jennings & Co.'s.:
Back Saws.....25&10%
Butcher Saws.....30&10%
Compass and Key Hole Saws..35&5&10%
Framed Wood Saws.....30&10%
Hand Saws.....30&2½&10%
Wood Saw Blades.....30&10%
Millers Falls:
Butcher Saws.....15&10%
Star Saw Blades.....15&10%
Peace:
Circular and Mill.....50%
Cross Cuts, list Jan. 1, '99.....50%
Hand, Panel and Rip.....30%
Richardson:
Circular and Mill.....50%
Hand, &c.....30%
X Cuts, list Jan. 1, '99.....50%
Simonds':
Circular Saws.....50%
Crescent Ground Cross Cut Saws..35%
One-Man Cross Cuts.....40&10%
Gang Mill, Mulay and Drag Saws..50%
Band Saws.....50%
Back Saws.....25@25&7½%
Butcher Saws.....35@35&7½%
Hand Saws.....25@2½&7½%
Hand Saws, Bay State Brand.....45%
Compass, Keyhole, &c.....25@25&7½%
Wood Saws.....35@35&7½%

Hack Saws—

Atkins' Hack Saw Blades A A A.... 30%
Disston:
Concave Blades.....25%
Keystone.....40%
Hack Saw Frames.....30%
Fitchburg File Works, The Best.....25%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180.... 35&5&10%
Hack Saws, Nos. 175, 180, complete, 35&5&10%
Griffin's Hack Saw Frames..35&5&10%
Griffin's Hack Saw Blades.....35&5&10%
Star Hack Saws and Blades.....15&10%
Sterling Hack Saw Blades.....25%
Sterling Hack Saw Frames.....20%

Scroll—

Barnes' No. 7, $15.....25%
Barnes' Scroll Saw Blades.....40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20.....20%
Lester, complete, $10.00.....15&10%
Rogers, complete, $4.00.....15&10%

Scalers, Fish—

Bishop's Lightning.....₱ doz. $2.00
Covert's Saddlery Works.....60&10%

Scales—

Family, Turnbull's.....30@30¢10%
Counter:
Hatch. Platform, ½ oz to 40 lbs. doz. $5.50
Two Platforms, ½ oz to 8 lbs. doz. $1.
Union Platform, Plain..$1.70@1.90
Union Platform, Striped $1.85@2.15
Chatillon's:
Eureka.....25%
Favorite.....40%
Grocers' Trip Scales.....50%
Penzoe Scales—Household, Counter, Candy, Ice, Postal, Computing.....50%
"The Standard" Portables.....45%
"The Standard" R. R. and Wagon.....50%

Scrapers—

Box, 1 Handle.....*doz. $2.25@2.50*
Box, 2 Handle.....*doz. $3.00@3.50*
Ship Light, $2.50; Heavy, $4.00
Adjustable Box Scraper (S. R. & L. Co) $6.00.....30@30&10%
Chapin-Stephens Co., Box.....50@50&10%

Screens, Window, and Frames—

Flyer Pattern Window Screen..60@60&5%
Maine Window Screen Frames..40&10&5%
Perfection Window Screens.....60@60&5%
Phillips' Window Screen Frames....60&5%
Porter's:
Fairview Window Screens..... 60&5@60&5&2½%
Hummer Window Screens..... 60&5@60&5&2½%
Klondike Window Screens..... 60&5@60&5&2½%
See also *Doors.*

Screws—Bench and Hand—

Bench, Iron..doz. 1 in.. $2.75@3.00:
1¼, $3.25@3.50: 1¼, $3.85@4.25
Bench, Wood, Beech..doz. $3.00@3.50
Hand, Wood.....30@30&5%
R. Bliss Mfg. Co, Hand.....30%
Chapin-Stephens Co., Hand.....30@30&10%

Coach, Lag and Hand Rail—

Lag, Common Point, list Oct. 1. '99.....70@15@..%
Coach and Lag, Gimlet Point, list Oct. 1, '99.....70@10@..%
Hand Rail, list Jan. 1, '81.60@10@...%

Jack Screws—

Standard List.....75@10@80@5%
Millers Falls.....50@10&10%
Millers Falls, Roller.....50@10%
P, S. & W.....50@50@10%
Sargent.....70@10%

Machine—

List Jan. 1, '98.
Flat or Round Head, Iron.50@50@10%
Flat or Round Head, Brass50@50@10%

Set and Cap—

Set (Iron or Steel).....70%
Sq. Hd. Cap.......65%*
Hex. Hd. Cap.....65%
Rd. or Fillister Hd. Cap.....60%

Wood—

List Jan. 1, 1900.
Manufacturers' printed discounts:
Flat Head, Iron.....87½@10@...%
Round Head, Iron.....85@10@...%
Flat Head, Brass.....85&10@...%
Round Head, Brass.....80@10@...%
Flat Head, Bronze....77½@10@...%
Round Head, Bronze.....75@10@..%
Drive Screws.....87½@10%

Scroll Saws—See *Saws, Scroll.*

Scythes— Per doz.

Clipper Pattern, Grass...$4.50@$5.00
Full Polished Clipper.....$5.00@$5.50
Grain.....$7.00@$7.50
Clipper, Grain.....$7.75@$8.25
Weed and Bush.....$4.75@$5.00

Seeders— Raisin—

Enterprise.....25@30%

Sets— Awl and Tool—

Brad Awl and Tool Sets:
Wood Hdle..10 Awls doz. $2.00@2.25
Wood Hdle., 14 Awls, 6 Tools, doz. $2.50@2.60
Aiken's Sets, Awl and Tools:
No. 20, ₱ doz. $10.00.....50&10&10%
Fray's Adj. Tool H'dls. Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7.....50%
C. E. Jennings & Co.'s Model Tool Holders.....30&10%
Millers Falls Adj. Tool H'dls, No. 1, $12; No. 4, $12; No. 5, $18.....15&10%
Stanley's Excelsior:
No. 1, $7.50; No. 2 $4.00; No. 3, $5.50.....30@30&10&10%

Garden Tool Sets—

Ft. Madison, Three Pieces, Hoe, Rake and Shovel.....₱ doz. sets.....$9.00

Nail—

Square.....per gro. $2.25@2.50
Round, Blk. and Pol., assorted..... gro. $1.80@2.30
Octagon.....gro. $4.00@4.25
Knurled, Good.....gro. $5.75@6.00
Buck Brothers.....27½%
Cannon's Diamond Point, ₱ gr. $12..25%
Mayhew's.....per gro. $9.00
Snell's Corrugated, Cup Pt. per gro. $7.50
Snell's Knurled, Cup Pt....per gro $7.50

Rivet—

Regular list.....70@10@75%

Saw—

Aiken's:
Genuine.....50&10%
Imitation.....50&10%
Atkin's.:
Criterion.....40%
Adjustable.....40%
Bemis & Call Co's.:
Cross Cut.....30%
Hammer, new Pat.....45%
Plate.....20%
Spring Hammer.....40%
Disston's Star and Monarch.....25%
Morrill's No. 1, $15.00.....50%
Nos. 3 and 4, Cross Cut, $20.63.....50%
No. 5, Mill, $30.00.....50%
Nos. 10, 11, 9½, $15.63.....50%
No. 1 Old Style, $10.00.....50%
Giant Royal, Cross Cut.....₱ doz. $9.00
Royal, Hand.....₱ doz. $5.40
Taintor Positive, ₱ doz. $18.....60%

Sharpeners, Knife—

Chicago Wheel & Mfg. Co.....65%
Smith & Hemenway Co.....70%

Shaves Spoke—

Iron.....doz. $1.00@1.15
Wood.....doz. $1.65@2.25
Bailey's (Stanley R. & L. Co).....50&50&10&10%
Chapin-Stephens Co.....50@50&10&10%
Goodell's, ₱ doz. $9.00.....15&10%
Wood's F1 and F2.....50%

Shears—

Cast Iron...	*7*	*8*	*9 in.*
Best	*$16.00*	*18.00*	*20.00 gro.*
Good	*$13.00*	*15.00*	*17.00 gro.*
Cheap	*$5.00*	*6.00*	*7.00 gro.*

Straight Trimmers, &c.:
Best quality, Jap.....70@70&10%
" Nickel.....60@60&10%
Fair qual. Jap.....80@80&5%
" Nickel.....75@75&10%
Tailors' Shears.....40@40&10%
Acme Cast Shears.....40@40&5%
Geneva.....60%
Heinisch's Tailors' Shears.....40%
Wilkinson's Hedge.....1900 list 45%
Wilkinson's Pruning.....40%
Wilkinson's Sheep.....1900 list. 25%

Tinners' Snips—

Steel Blades.....20@5@20@10
Steel Laid Blades.....40@10@20%
Forged Handles, Steel Blades, Berlin.....40@40@10%
Jennings & Griffin Mfg. Co.'s, 6½ to 10 inch.....40&7½&10%
Niagara Snips.....40%
P., S & W. Co.....30%

Pruning Shears and Tools—

Cronk's Grape Shears.....33⅓%
Cronk's Pruning Shears.....33⅓%
Disston's Combined Pruning Hook and Saw, ₱ doz. $18.00.....25%
Disston's Pruning Hook, ₱ doz. $12.00.....25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades.....40@40&5%
Orange Shears.....50&10@50&20%
Grape.....40&10@50%
Tree Pruners.....75%
P., S. & W. Co.....33⅓%

Sheaves—Sliding Door—

Stowell's Anti-Friction.....50%
Patent Roller Hatfield's, Sargent's list.....70&10%
Reading.....70&10@75%
R. & E. list.....33⅓%
Wrightsville Hatfield Pattern.....80%

Sliding Shutter—

Reading list.....70&10@75%
R. & E. list.....33⅓%
Sargent's list.....50&10%

Shells— Shells, Empty—

Brass Shells, Empty:
First quality, all gauges.....60&5%
Climax, Club, Rival, 10 and 12 gauge.....65&5%
Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge..25&5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, New Victor, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge.....20%
Climax, Union, League, New Rival 10 and 12 gauge.....25%
Climax, Union, League, New Rival, 14, 16 and 20 gauge ($7.50 list)..20%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge.....33⅓&5%
Robin Hood, Low Brass.....20&10%
Robin Hood, High Brass.....30&10%

Shells, Loaded—

Loaded with Black Powder.....40%
Loaded with Smokeless Powder, medium grade.....40@5%
Loaded with Smokeless Powder, high grade.....40@10@10%
Robin Hood, Low Brass.....50%
Robin Hood, High Brass.....50&10&5%

Shoes Horse, Mule, &c.—

F. o. b., Pittsburg:
Iron.....per keg $3.85
Steel.....per keg 3.60
Burden's, all sizes, ₱ keg.....$3.90

Shot—

Drop, up to B, 25-lb. bag.....$1.40
Drop, B and larger, per 25-lb. bag $1.65
Buck, 25-lb. bag.....$1.65
Chilled, 25-lb. bag.....$1.65
Dust Shot, 25-lb. bag.....$2.00

Shovels and Spades—

Association List, Nov. 15, 1902....40%

Sieves and Sifters—

Hunter's Imitation. gro. $11.00@11.50
Buffalo Metallic Blued. S. S. & Co., ₱ gr.:

14&16	16&18	18&20
$12.90	$13.80	$15.00

National Mfg. Co.:
Victor.....per gro. $12.00
Surprise.....per gro. $11.00
No Name.....per gro. $11 00
Shaker (Barler's Pat.) Flour Sifters. ₱ doz., $2.00.....40%

Sieves, Tin Rim—

Per dozen.

Mesh	*14*	*16*	*18*	*20*
Black, full size	*$1.20*	*1.25*	*1.30*	*1.35*
Plated, full size	*$1.30*	*1.35*	*1.40*	*1.45*
Black, scant	*....*	*$0.95*	*1.00*	*1.05*

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested, doz.....$0.65@0.75
Mesh 20, Nested, doz.....75@.85
Mesh 24, Nested, doz.....90@1.00

Sinks—

Cast Iron—

Standard list.....60@60@10%
NOTE.—*There is not entire uniformity lists used by jobbers.*

Skeins, Wagon—

Cast Iron.....70@70@10%
Malleable Iron.....40@10@50%
Steel.....40@40@10%

Slates, School—

Factory Shipments.
"D" Slates.....45%
Noiseless Slates.....60@4 tens &5%
Wire Bound.....40%

Slaw Cutters—See *Cutters.*

Slicers, Vegetable—

Sterling No. 10, $2.00.....33⅓

Snaps, Harness—

German.....40@40@10%
Covert Mfg. Co.:
Derby.....30&5&2%
High Grade.....45%
Jockey.....30&10%
Trojan.....45%
Yankee.....30&5&2%
Yankee, Roller.....30&5&2%
Covert's Saddlery Works:
Crown.....60%
German.....60%
Model.....60%
Triumph.....60%
Oneida Community:
Solid Steel.....60&5%
Solid Swivel.....60%
Sargent's Patent Guarded.....60%&10%

Snaths—

Scythe.....50@50&10%

Snips, Tinners'—See *Shears.*

Spoons and Forks—

Silver Plated—

Good Quality.....50&10@60&10&5%
Cheap.....60@60&10%
International Silver Co.
1847 Rogers Bros. and Rogers & Hamilton.....40&10%
Rogers & Bro., William Rogers Eagle Brand.....50&10%
Anchor, Rogers Brand.....60%
Wm. Rogers & Son.....60&10%
Simeon L. & Geo. H. Rogers Co.:
Silver Plated Flat Ware.....60%
No. 77 Silver Plated Ware.....60&10%

Miscellaneous—

German Silver.....60@60&10%
Cattaraugus Cutlery Co.:
Yukon Silver.....50%
Simeon L. & Geo. H. Rogers Co.:
German or Nickel Silver, Special list 1, &10%

Tinned Iron—

Teas.....per gro. 45@5-ic
Tables.....per gro. 90c@$1.00

Springs— Door—

Gem (Coil).....20%
Star (Coil).....30%
Torrey's No. 39 in.....₱ doz. $1.10
Victor (Coil).....50&10&10%

Carriage, Wagon, &c.

1¼ in. and Wider:
Black or ⅛ Bright, lb.....4¾@5 c
Bright, lb.....5¼@5½c
Painted Seat Springs:
1½ x 2 x 26, per pr.....50@55c
1½ x 2 x 28 per pr.....60@65c
1½ x 3 x 28 and narrower, per pr. 80@85c

Sprinklers, Lawn—

Enterprise.....25@30%
Macksey.....₱ doz. $1.80
Philadelphia No. 1, ₱ doz. $12; No. 2, $15; No. 3, $24.....30%

Squares—

Nickel plated.... } *List Jan. 5, 1900.*
Steel and Iron... } .....70&10%
Rosewood Hdl Try Square and T-Bevels.....60&10@10@70%
Iron Hdl. Try Squares and T-Bevels. 50&10@50&10&10%
Disston's Try Sq. and T-Bevels.....70%
Winterbottom's Try and Miter.....40&10@40&10&10%

Squeezers— Lemon—

Wood, Common, gro., No. 0, $5.25@$5.50: No. 1. $6.25@$6.50.
Wood, Porcelain Lined.
Cheap.....doz. $2.50@2.75
Good Grade.....doz. $3.00@3.50
Tinned Iron.....doz. $0.75@1.25
Iron, Porcelain Lined doz. $2.90@3.25

Staples—

Barbed Blind.....lb. 6@6½c
Electricians', Association list.....80&10&10&10%
Fence Staples, See Trade Report, Galvanized, 15c less than Barb Wire. Polished, 20c less than Barb Wire.
Poultry Netting, Staples....per lb.. 3½@3¾c
Grand Crossing Tack Co.'s list.....80&10%

Steels, Butchers'—

Dick's.....30%
Foster Bros'.....30%
Hartzell Cutlery Co.....60&5%
C. & A. Hoffmann's.....40%

Steelyards.....25&10@30&10%

Stocks and Dies—

Blacksmiths'.....40&10@50%
Curtis Reversible Ratchet Die Stock.25%
Derby Screw Plates.....25%
Gardner Die Stocks No. 1.....50%
Gardner Die Stocks, larger sizes.....40%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plates.....25&30%

Stone—

Scythe Stones—

Chicago Wheel & Mfg. Co:
Gem Corundum, 10 inch, $8.00 per gro., 12 inch, $10.50
Pike Mfg. Co. 1901 list:
Pike Mfg. Co. 1901 list: ₱ gro.
Pike Black Diamond S. S.....₱ gro. $12.00
Lamoille S. S.....₱ gro. $11.00
White Mountain S. S.....₱ gro. $9.00
Green Mountain S. S.....₱ gro. $6.00
Extra Indian Pond S. S. ₱ gro. $7.50
No. 1 Indian Pond S. S. ₱ gro. $7.00
No. 2 Indian Pond S. S. ₱ gro. $4.50
Leader Red End S. S.....₱ gro $4.50
Balance of 1901 list 33⅓%.
(40%)

Oil Stones, &c.

Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit.....50%
Gem Corundum Axe, Single or Double Grit.....55%
Gem Corundum Slips.....55%
Gem Corundum Razor Hones.....50%
Pike Mfg. Co. 1901 list: ₱ lb.
Arkansas Stone, No. 1, 3 to 5½ in. $2.80
Arkansas Stone, No. 1, 5½ to 8 in. $3.50
Arkansas Slips No. 1.....$4.00
Lily White Washita 4 to 8 i.....60¢
Rosy Red Washita 4 to 8 in.....60¢
Washita Stone, Extra, 4 to 8 in..50¢
Washita Stone, No. 1, 4 to 8 in..40¢
Washita Stone, No. 2, 4 to 8 in..30¢
Lily White Slips.....90¢
Rosy Red Slips.....90¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
India Oil Stones (entire list).....33⅓%
(33⅓%)

Hindostan No. 1, Regular.....₱ D 8¢
Hindostan No. 1 Small.....₱ D 10¢
Axe Stones (all kinds).....40%
Turkey Oil Stones, ex. 5 tos in. ₱ D 80¢
Queer Creek Stones, 4 to 8 in.....20¢
Queer Creek Slips.....40¢
Sand Stone.....5¢
Belgian, German and Swaty Razor Hones.....50%
Natural Grit Carving Knife Hones, ₱ doz.....$3.00
Quick Edge Pocket Knife Hones, ₱ doz.....$3.00
Mounted Kitchen Sand Stone, ₱ doz.....$1.50
(40%)

Stoners— Cherry—

Enterprise.....25@30%

Stops Bench—

Millers Falls.....15&10%
Morrill's...₱ doz., No. 1, $10.00.....50%
Morrill's, No. 2, $12.50.....50%

Door—

Chapin-Stephens Co.....60@60&10%

Plane—

Chapin-Stephens Co.....30%

Straps— Box—

Carry's Universal, case lots.....20@10%

Hame—

Covert's Saddlery Works.....60&10%

Stretchers, Carpet—

Cast Iron, Steel Points....doz. 55@60c
Socket.....doz. $1.35

Stuffers, Sausage—

Enterprise Mfg. Co.....25@25&7½%
National Specialty Mfg. Co., list Jan. 1, '97.....30%

Supports, Porch—

Hoffman's Porch Supports....₱ doz. 25¢

Sweepers, Carpet—

National Sweeper Co.:	Per doz.
Marion, Roller Bearing, regular finishes, full Nickel	$24.00
Marion Queen, Roller Bearing, Fancy Veneers, full Nickel	$27.00
Monarch, Roller Bearing, Nickel	$22.00
Monarch, Roller Bearing, Jap'ned	$20.00
Marion Queen, Roller Bearing, Regular Finishes, full Nickel	$24.00
Transparent, Roller Bearing, Plate Glass Top, Nickel	$32.00
Monarch Extra, Roller Bearing, (17-inch case), Nickel	$36.00
Monarch Extra, Roller Bearing (17-inch case), Japanned	$33.00
Perpetual, Regular Bearings, Nkl.	$20.00
Perpetual, Regular Bearings, Jap.	$18.00

NOTE.—*Discount of 50c per dozen on three-dozen lots. Discount of $1 per dozen on five-dozen lots.*

Tacks Brads, &c.—

List Jan. 15, '99.
Carpet Tacks, American.....90@25@5@...%
American Cut Tacks.90@30@5@...%
Swedes Iron Tacks...90@30@5@...%
Swedes Upholsterers' Tacks.....90@5&10@5@...%
Gimp Tacks.....90@15@5@...%
Lace Tacks.....90@40@...%
Trimmers' Tacks..90@30@10@5@...%
Looking Glass Tacks....70@10@...%
Bill Posters' and Railroad Tack....90@15@5@...%
Hungarian Nails....80@20@5@...%
Common and Patent Brads....80@10%
Trunk and Clout Nails...80@5@...%

NOTE.—*The above prices are for Straight Weights.* An extra 5% is given Star Weights** and an extra 10@5% on Standard Weights.****

Miscellaneous—

Double Pointed Tacks...90 and 5 tens
Steel Wire Brads, R. & E. Mfg. Co's list.. 50&10@60%

See also *Nails, Wire.*

Tanks, Oil—

	Each.
Emerald, S. S. & Co.	30-gal $3.40
Emerald, S. S. & Co.	60-gal. $4.25
Queen City S. S. & Co., 85-gal.	$3.65
Queen City S. S. & Co., 60-gal.	$4.50

Tapes, Measuring—

American Asses' Skin.....40@10@5%
Patent Leather.....25@30@5%
Steel.....40@40@5%
Chesterman's.....25@25@5%
Keuffel & Esser Co., Steel and Metallic, Lower list, 1899.....35%
Lufkin's Steel.....33⅓&35%
Lufkin's Metallic.....30@30&5%

Teeth Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger, per 100 lbs..$3.00

Thermometers—

Tin Case.....80@10@80@10@5%

Ties, Bale—Steel Wire.

Single Loop.....80@2½%
Monitor, Cross Head, Etc.....70%

Ties, Wall—

Cleveland Wire Spring Co.:
Galv. Steel 5-32 x 6½ in. ₱ 1000..$10.00
Galv. Steel 5-32 x 8½ in. ₱ 1000..$11.00
Galv. Steel 5-32 x 11½ in. ₱ 1000..$12.00
Galv. Steel 5-32 x 13½ in. ₱ 1000..$14.00

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tips, Safety Pole—

Covert's Saddlery Works.....60&10%

Tire Benders, Upsetters, &c.—See *Benders and Upsetters, Tire.*

Tools—Coopers'—
L. & I. J. White ..... 20@20&5%

Hay—
Myers' Hay Tools 30%

Saw—
Atkins' Cross Cut Saw Tools 40%
Simonds' Improved 33⅓%
Simonds' Crescent 25%

Ship—
L. & I. J. White 25%

Transom Lifters—
See *Lifters, Transom.*

Traps—Fly—
Balloon, Globe or Acme ..... doz. $1.15@1.25; gro. $11.50@12.00
Harper, Champion or Paragon ..... doz. $1.25@1.50; gro. $13.00@13.50

Game—
Oneida Pattern ..... 80@30&5%
Newmouse ..... 45@45&5%
Hawley & Norton ..... 65&5@65&10%
Victor (Oneida Pattern) ..... 75@75&5%
Star (Blake Pattern) ..... 60&5@60&10%

Mouse and Rat—
Mouse, Wood, Choker, doz. holes ..... 8½@9c
Mouse, Round or Square Wire ..... doz. 85@90c
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, Each $1.12½; ₱ doz. $12.00
No. 3, Rat, ₱ doz. $6.00; case of 50 $5.25 doz.
No. 3½, Rat, ₱ doz. $4.75; case of 72 $4.25 doz.
No. 4, Mouse, ₱ doz. $3.50; case of 7 $2.75 doz.
No. 5, Mouse, ₱ doz. $2.75; case of 150 $2.25
Schuyler's Rat Killer, No. 1, ₱ gr. $30.00
No. 2, ₱ gr. $20.00; Mouse, No. 3, $18.00 ..... 50%
J. M. Mast Mfg. Co.: Per gro.

	Mouse.	Rat.
Blizzard	No. 12, $3.00	No. 1, $9 50
Old Nick	No. 30, 2.22	No. 2, 8.40
Joker	No. 5, 2.10	No. 3, 8.40

Imp'd Snap Shot, Mouse, per gro., 2 hole, $2 40.
Imp'd Snap Shot, Mouse, per gro., 4 hole, $4.20.

Trimmers Spoke—
Bonney's Nos. 1 and 2 ..... 40%
Wood's F 1 ..... 30%

Trowels—
Disston Brick and Pointing 30%
Disston Plastering 25%
Disston "Standard Brand" and Garden Trowels 35%
Kohler's Steel Garden Trowels, 5 in. ..... ₱ gro. $5.00
Kohler's Steel Garden Trowels, 6 in. ..... ₱ gro. $6.00
Never-Break Steel Garden Trowels ..... gro. $6.00
Peace's Plastering 30%
Rose Brick and Plastering ..... 25&5%
Woodrough&McParlin,Plas'ring 25%

Trucks, Warehouse, &c.—
B. & L. Block Co.:
New York Pattern ..... 30&10%
Western Pattern ..... 60&10%
Handy Trucks ..... per doz. $16.00
Grocery ..... per doz. $15.00
Daisy Stove Trucks, Improved pattern ..... ₱ doz. $18.50
Model Stove Trucks ..... ₱ doz. $18.50

Tubs, Wash—

	No. 1	2	3
Galvanized, per doz.	*$4.75*	*5.25*	*6.00*

Galvanized Wash Tubs (S. S. & Co.):

No.	1	2	3	10	20	30
Per doz.	$5.25	6.00	6.75	6.50	7.00	8.00

Twine—Miscellaneous—

Flax Twine—	*BC*	*B.*
No. 9, ¼ and ½-lb. Balls	*21½c*	*23½c*
No. 12, ¼ and ½ lb. Balls	*17½c*	*19½c*
No. 18, ¼ and ½-lb. Balls	*15½c*	*17½c*
No. 24, ¼ and ½-lb. Balls	*15 c*	*17 c*
No. 36, ¼ and ½-lb. Balls	*14½c*	*16½c*

Chalk Line, Cotton, ½-lb Balls ..... 22@22½c
Cotton Mops, 6, 9, 12 and 15 lb. to doz 8c
Cotton Wrapping 5 Balls to lb ... according to quality ..... 11c@17c
American 2-Ply Hemp, ¼ and ½-lb. Balls ..... 13@14c
American 3 Ply Hemp, 1-lb. Balls .. 13@14c
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine) 8c
India 3-Ply Hemp, 1-lb. Balls 8c
India 3-Ply Hemp, 1¼-lb. Balls .. 7c
2, 3, 4 and 5-Ply Jute, ½-lb. Balls ... 8@9c
Mason Line, Linen, ½-lb. Balls .. 45c
No. 265 Mattress, ¼ and ½-lb. Balls 37c
Wool, 3 to 6 ply ..... 5@5½c

Binder—

	Cents per lb
Sisal	10¼
Standard	10¼
Standard Manila (550 ft.)	11
Manila (600 ft.)	12
Pure Manila (650 ft.)	12¾

F. o. b. Eastern Mill. Carload lots ¼ cent less.

Vises—
Solid Box ..... 50&10@50&10&5

Parallel—
Athol Machine Co.:
Simpson's Adjustable 40%
Standard 40%
Amateur 25%
Bonney's 40%
Columbian Hdw Co 40%
Emmert Universal:
Pattern Makers' No. 1 ..... $15.00 net
Pattern Makers' No 2 ..... $13.00 net
Machinist and Tool Makers' ..... $15.00 net
Fisher & Norris Double Screw ..... 15&10%
Hollands':
Machinists' 40%
Keystone ..... 65&5%
Lewis Tool Co ..... 20@30%
Merrill's 20%
Miller's Falls ..... 50&10&10%
Parker's:
Victor ..... 20@25%
Regulars ..... 20@25%
Vulcan's ..... 40@45%
Combination Pipe ..... 55&60%
Prentiss ..... 20@25%
Sargent's 40%
Smith & Hemenway Co.:
Machinists 40%
Jewelers 33⅓%
Snedliker's X, L 33⅓%
Stephens' 33⅓%

Saw Filers'—
Bonney's, No. 1, $13; No. 3, $16 ..... 50&5%
Disston's D 3 Clamp and Guide, ₱ doz $30 ..... 25%
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3 ..... 45&50%

Wood Workers'—
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—
Bignall & Keeler Combination Pipe Vise 60%
Parker's Combination Pipe:
87 Series 60%
187 Series ..... 60&5%
No. 870 ..... 40%

Wads—Price Per M.
Dis. 15%

B. E., 11 up	*60c*
B. E., 9 and 10	*70c*
B. E., 8	*80c*
B. E., 7	*80c*
P. E., 11 up	*$1.00*
P. E., 9 and 10	*1.25*
P. E., 8	*1.50*
P. E., 7	*1.50*
Ely's B. E., 11 and larger	*$1.70@1.75*
Ely's P. E., 12 to 20	*$3.00@3.25*

Ware, Hollow—Cast Iron, Hollow—
Stove Hollow Ware:
Ground ..... 50&10@60%
Unground ..... 60&5@65%
White Enameled Ware:
Maslin Kettles 70%
Covered Ware:
Tinned and Turned 40%
Enameled 50%
See also *Pots Glue.*

Enameled—
Agate Nickel Steel Ware, list Nov. 1, '01 ..... 30&20%
Iron Clad Ware ..... 70&10%
Lava, Enameled ..... 40&10%
Never Break Enameled 50%

Tea Kettles—
Galvanized Tea Kettles:

Inch	*6*	*7*	*8*	*9*
Each	*45c*	*50c*	*55c*	*65c*

Steel Hollow Ware.
Avery Spiders & Griddles ..... 65@65&5%
Avery Kettles 60%
Porcelained ..... 50&5@50&10%
Never Break Spiders and Griddles ..... 65&5%
Never Break Kettles 60%
Solid Steel Spiders & Griddles ..... 65&5%
Solid Steel Kettles 60%

Warmers, Foot—
Pike Mfg. Co., Soapstone ..... 40@40&10%

Washboards—
Solid Zinc: ₱ doz
Crescent, family size, bent frame. $3.00
Red Star, family size, stationary protector $3.00
Double Zinc Surface:
Saginaw Globe, family size, stationary protector $2.85
Cable Cross, family size, stationary protector $2.90
Single Zinc Surface:
Naiad, family size, open back perforated $2.40
Saginaw Globe, protector, family size, ventilated back $2.25
Brass Surface:
Brass King, Single Surface, open back $3.00
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.00

Washers—
Leather, Axle—
Solid ..... 85c@10c@10@85c@10c@10%
Patent ..... 85c@10@85c@20%
Coil: ⅛ 1 1¼ 1¼ Inch, 10c 11c 12c 15c per box

Iron or Steel—
Size bolt .... 5-16 ⅜ ½ ⅝ ¾
Washers $6.30 5.50 4.50 4.40 4.20
In lots less than one keg add ½c per lb., 5-lb. boxes add ½c to list.

Cast Washers—
Over ½ inch, barrel lots, per lb ..... 1¼@2c

Waterers, Hog—
Improved Dewey ..... ₱ doz $26.00

Wedges—
Oil Finish ..... lb. 2.90@3.10c

Weights—

Hitching—
Covert's Saddlery Works ..... 60&10%

Sash—
Per ton, f. o. b. factory:
Eastern District $26.00
Western, Central and Southern Districts $27.00

Wheels, Well—
8-in., $1.60@1.80; 10-in., $2.00@2.25; 12-in., $2.45@2.65; 14-in., $4.00@4.25

Wire and Wire Goods—
Bright and Annealed:
6 to 9 ..... 72½&5@72½&10%
10 to 18 ..... 72½&10@72½&10&5%
19 to 26 ..... 75&10@2½@75&10@2½%
27 to 36 ..... 75&10@2½@80&2½%
Galvanized:
6 to 18 ..... 70@70&5%
19 to 26 ..... 72½&5@72½@10%
27 to 36 ..... 72½&10@72½&10&5%
Coppered:
6 to 9 ..... 70&5@70&10%
10 to 18 ..... 70&10@70&10&5%
19 to 26 ..... 75&10@75&10&2½%
27 to 36 ..... 75&10@75&10&5%
Tinned:
6 to 14 ..... 75@75&7½%
15 to 18 ..... 72½@73%
19 to 26 ..... 70&5@70&5&5%
27 to 36 ..... 70@70&5%
Annealed Wire on Spools ..... 70@70&5%
Brass and Copper Wire on Spools. 60@60&5%
Brass, list Feb. 26, '96 ..... 25@30%
Copper, list Feb. 26, '96 ..... 15%
Cast Steel Wire 50%
Stubs' Steel Wire ..... $6.00 to £. 50%
Wire Clothes Line, see *Lines.*
Wire Picture Cord, see *Cord.*

Bright Wire Goods—
List April 1, 1901 ..... 85c&10c&10@90%

Wire Cloth and Netting—
Galvanized Wire Netting ..... 80c&10%
Painted Screen Cloth per 100 ft. $1.15
Light Hardware Grade:
2-8 Mesh, Plain (8c. list) sq. ft... 1¾@2c
2-8 Mesh, Galv. (8c. list) sq. ft.. 2½@2¾c

Wire, Barb—See *Trade Report.*

Wrenches—
Agricultural ..... 80@80c&10%
Baxter Pat'n S Wrenches ..... 70c&5@70c&10%
Drop Forged S ..... 45@45c&5%
Acme ..... 60&10%
Alligator 70%
Alligator Pattern 70%
Bull Dog 70%
Bemis & Call's:
Adjustable S ..... 35&5%
Adjustable S Pipe 40%
Brigg's Pattern ..... 30&10%
Combination Black ..... 40&5%
Combination Bright 40%
Cylinder or Gas Pipe 55%
Extra Heavy 45%
Merrick's Pattern 50%
No. 3 Pipe, Bright 55%
Boardman's 33⅓%
Coes' Genuine ..... 40&10&5%
Coes' "Mechanics" ..... 40&10&10&5%
Donohue's Engineer ..... 40&10%
Dudly Auto ..... 50&5@50&10%
Eagle ..... 50&10%
Elgin Wrenches 40%
Elgin Monkey Wrench Pipe Jaws .. 33⅓%
Gem Pocket 30%
Hercules 70%
W. & B. Machinist:
Case lots ..... 50&10%
Less than case lots ..... 50&5%
Improved Pipe (W & B.) 60%
Solid Handles, P.S. & W .... 50@50&5%
Stillson 65%
Triumph ..... 60&10%
Vulcan Chain 50%

Fruit Jar—
Triumph Fruit Can Wrenches, ₱ gro. $19.20
Syrup Cap Wrenches ..... ₱ gro. $3.00
T & B Fruit Jar Wrenches, ₱ gro $16.50
T & B Fruit Jar Holders ₱ gro. $30.00
} 30%

Wrought Goods—
Staples, Hooks, &c., list March 17 '92 ..... 30@90@5%

Yokes Neck—
Covert Saddlery Works, Trimmed 70%
Covert Saddlery Works, Neck Yoke Centers 70%

Yokes, Ox, and Ox Bows—
Fort Madison's Farmers & Freighters' .. list net

Zinc—
Sheet ..... lb 7 @7¼c

PAINTS, OILS AND COLORS.

White Lead, Zinc, &c.
Lead, English white, in Oil .... 7¼@ 9%
Lead, American White, in Oil:
Lots of 500 ℔ or over ..... @ 6¾
Lots less than 500 ℔ ..... @ 7¼
Lead, White, in oil, 25 ℔ tin pails, add to keg price ..... @ ⅛
Lead, White, in oil, 12½ ℔ tin pails, add to keg price ..... @ 1
Lead, White, in oil, 1 to 5 ℔ assorted tins, add to keg price .... @ 1¼
Lead, American, Terms: For lots 12 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice; for lots of less than 500 lbs. net.
Lead White, Dry in bbls ..... 5¾@ 6¼
Zinc, American, dry ..... ₱ ℔ 4¾@ 4¾
Zinc, Paris, Red Seal, dry ..... @ 8%
Zinc, Paris, Green Seal, dry ..... @ 9½
Zinc, Antwerp Red Seal, dry ..... @ 7¾
Zinc, Antwerp, Green Seal, dry ... @ 8%
Zinc, V. M. French, in Poppy Oil, Green Seal:
Lots of 1 ton and over ..... 12 @12½
Lots of less than 1 ton ..... 12¼@12¾
Zinc, V. M. French, in Poppy Oil, Red Seal:
Lots of 1 ton and over ..... 10¾@11¼
Lots of less than 1 ton ..... 11@11¼
DISCOUNTS.—V. M. French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors.
Black, Carbon ..... ₱ ℔ 5 @10
Black, Drop, Amer ..... 4 @ 6
Black, Drop, Eng ..... 5 @15
Black, Ivory ..... 16 @20
Lamp, Com ..... 4½@ 6
Blue, Celestial ..... ₱ ℔ 4 @ 6
Blue, Chinese ..... 29 @32
Blue, Prussian ..... 27 @30
Blue, Ultramarine ..... 3½@15
Brown, Spanish ..... ½@ 1
Brown, Vandyke, Amer ..... 1½@ 2
Brown, Vandyke, Foreign ..... 2½@ 3½
Carmine, No. 40 ..... ₱ ℔ $2.25@2.50
Green, Chrome, ordinary ..... 3½@ 6
Green, Chrome, pure ..... 17 @35
Lead, Red, bbls. ½ bbls. and kegs:
Lots 500 ℔ or over ..... @ 6¾
Lots less than 500 ℔ ..... @ 7¼
Litharge, bbls. ½ bbls. and kegs:
Lots 500 ℔ or over ..... @ 6¾
Lots less than 500 ℔ ..... @ 7¼
Ocher, French Washed ..... 5 @ 7
Ocher, Dutch Washed ..... 5 @ 7
Ocher, American ..... ₱ ton $10.00@13.00
Orange Mineral, English ..... ₱ ℔ 8½@ 9½
Orange Mineral, French ..... 10½@11½
Orange Mineral, German ..... 8½@9½
Orange Mineral, American .... 8½@ 8½
Red, Indian, English ..... 4½@ 8½
Red, Indian, American ..... 3 @ 3½
Red, Turkey, English ..... 4 @ 6
Red, Tuscan, English ..... 7 @10
Red, Venetian, Amer., ₱ 100 ℔ .50@1.50
Red Venetian, English, ₱ 100 ℔ 1.25@1 75
Sienna, Italian, Burnt and Powdered ..... ₱ ℔ 3½@ 7½
Sienna, Ital., Raw, Powd ..... 3½@ 7½
Sienna, American, Raw ..... 1½@ 2
Sienna, American, Burns and Powdered ..... ₱ ℔ 1½@ 2
Talc, French ..... ₱ 100 ℔ $1.25@1.50
Talc, American ..... 90 @1.10
Terra Alba, French, ₱ 100 ℔ .95 @1.00
Terra Alba, English ..... 95 @1.00
Terra Alba, American No. 1 .... 85 @85
Terra Alba, American No. 2 .... 45 @50
Umber, Turkey, Bnt. & Pow. ₱ ℔ 2½@ 3½
Umber, Turkey, Raw & Powd. 2½@ 3½
Umber, Bnt. Amer ..... 1½@ 2
Umber, Raw, Amer ..... 1½@ 2
Yellow, Chrome ..... 11 @14
Vermilion, American Lead ..... 10 @40
Vermilion, Quicksilver, bulk ... @70
Vermilion, Quicksilver, bags ... @71
Vermilion, English, Import .. .80 @85
Vermilion, Chinese ..... $1.05@1.20

Colors in Oil.
Black, Lampblack ..... 12 @14
Blue, Chinese ..... 36 @40
Blue, Prussia ..... 32 @35
Blue, Ultramarine ..... 13 @16
Brown, Vandyke ..... 11 @14
Green, Chrome ..... 10 @15
Green, Paris ..... @24
Sienna, Raw ..... 12 @15
Sienna, Burnt ..... 12 @15
Umber, Raw ..... 11 @14
Umber, Burnt ..... 11 @14

Miscellaneous.
Barytes, Foreign, ₱ ton .... $19.00@21.00
Barytes, Amer. floated ..... 18.50@20.00
Barytes, Crude, No. 1 ..... 9.00@10.00
Chalk, in bulk ..... ₱ ton 3.25@ 3.50
Chalk, in bbls ..... ₱ 100 ℔ .@ 35
China Clay, English .. ₱ ton 11.00@17.00
Cobalt, Oxide ..... ₱ 100 ℔ 2.00@ 2.65
Whiting, Common ..... ₱ 100 ℔ .48@ .55
Whiting, Gilders ..... .62½@ .68
Whiting, extra Gilders' .... .66@ .72

Putty.
In bladders ..... 1¾@2½
In bulk ..... 1½@2
In cans 1 ℔ to 5 ℔ ..... 2½@4¼
In cans 12½ ℔ to 25 ℔ ..... 1½@2¼

Spirits Turpentine.
In Oil bbls ..... 50½&51 @
In machine bbls ..... 51 @51½@

Glue.
Cabinet ..... ₱ ℔ 11½@16
Extra White ..... 18 @23
French ..... 12 @40
Irish ..... 13½@16
Low Grade ..... 9 @12
Medium White ..... 14½@16½

Animal, Fish and Vegetable Oils.
Linseed, City, raw ..... ₱ gal. 42 @ 43
Linseed, City, boiled ..... 44 @47
Linseed, State and West'n, raw .. 40 @41
Linseed, raw Calcutta seed .... 75 @ ..
Lard, Prime ..... 71 @72
Lard, Extra No. 1 ..... 56 @58
Lard, No. 2 ..... 41 @45
Cotton-seed, Crude, f. o. b. mills. 30 @33½
Cotton-seed, Summer Yellow, prime ..... 41½@43
Cotton-seed, Summer Yellow, off grades ..... 38 @38½
Sperm, Crude ..... @ ..
Sperm, Natural Spring ..... 67 @68
Sperm, Bleached Spring ..... 68 @69
Sperm, Natural Winter ..... 70 @72
Sperm, Bleached Winter ..... 72 @74
Tallow, Prime ..... 55 @56
Whale, Crude ..... @ ..
Whale, Natural Winter ..... 46 @47
Whale Bleached Winter ..... 48 @49
Menhaden, Brown, Strained .. 31 @32
Menhaden, Bleached Winter .. 34 @35
Menhaden, Ex Bleached Winter 36 @37
Cocoanut, Ceylon ..... 5½@5¾
Cocoanut, Cochin ..... 5¾@6
Cod, Domestic ..... 35 @37
Cod, Newfoundland ..... 42 @43
Red Elaine ..... 45 @46
Red Saponified ..... ₱ ℔ 47½@ 5
Olive, Italian, bbls ..... 52 @ 57
Neatsfoot, prime ..... 57 @58
Palm, prime, Lagos ..... ₱ ℔ 5¾@ 5¾

Mineral Oils.
Black, 20 gravity, 25@30 cold test ..... ₱ gal. 13 @14
Black, 29 gravity, 15 cold test. 13½@14½
Black, Summer ..... 12½@13½
Cylinder, light filtered ..... 20½@21½
Cylinder, dark filtered ..... 18½@19½
Paraffine, 903-907 gravity ..... 15 @15½
Paraffine, 903 gravity .. .. 14 @14½
Paraffine, 883 gravity ..... 11¾@12
Paraffine, red, No. 1 ..... 15 @15½
In small lots ½¢ advance.

CURRENT METAL PRICES.

JUNE 24, 1903.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from Store—

Refined Iron:	
1 to 1⅝ in. round and square	₩ lb. @2.10¢
1⅝ to 4 in. x ⅜ to 1 in.	₩ lb. @2.10¢
1⅝ to 4 in. x ⅛ to 5-16	₩ lb. @2.30¢
Rods—⅜ and 11-16 round and square	₩ lb. @2.30¢
Angles:	Cts ₩ lb.
3 in. x ¼ in. and larger	2.30¢
3 in. x 3-16 in. and ⅛ in.	2.55¢
1¼ to 2½ in. x ⅛ in.	2.35¢
1¼ to 2½ in. x 3-16 in. and thicker	2.30¢
1 to 1¼ in. x 3-16 in.	2.35¢
1 to 1¼ x ¼ in.	2.40¢
⅞ x ¼ in.	2.25¢
¾ x ¼ in.	2.65¢
⅝ x ¼ in.	3.45¢
½ x 3-32 in.	3.95¢
Tees:	
1 in.	2.80¢
1¼ in.	2.60¢
1½ in. and larger	2.50¢
Beams	2.50@3.00¢
Channels, 3 in. and larger	2.50@3.00¢
Bands—1½ to 6 x 3-16 to No. 8	₩ lb. 2.40¢
"Burden's Best" Iron, base price	₩ lb. 3.05¢
Burden's "H. B. & S. Iron, base price	₩ lb. 2.85¢
"Ulster"	₩ lb. 3.15¢
Norway Bars	3.75@4.25¢
Norway Shapes	4.00@4.50¢

Merchant Steel from Store—

	per lb
Bessemer Machinery	2.10¢
Toe Calk, Tire and Sleigh Shoe	2.30@3.00¢
Best Cast Steel, base price in small lots	7¢

Soft Steel Sheets—

¼ inch	2.40¢	No. 14	2.70¢
3-16 inch	2.40¢	No. 16	2.80¢
No. 8	2.40¢	No. 18	2.90¢
No. 10	2.50¢	No. 20	3.00¢
No. 12	2.60¢	No. 22	3.10¢

Sheet Iron from Store.

Black.

	One Pass, C. R. Soft Steel	G. R. Cleaned.
Nos. 14 to 16	₩ lb. 2.90	3.0 ¢
Nos. 18 to 21	₩ lb. 3.00	3.10¢
Nos. 22 to 24	₩ lb. 3.10	3.2 ¢
Nos. 25 and 26	₩ lb. 3.20	3.30¢
No. 27	₩ lb. 3.30	3.40¢
No. 28	₩ lb. 3.40	3.50¢

Russia, Planished, &c.

Genuine Russia, according to assortment	₩ lb. 11½@14¢
Patent Planished	₩ lb. A, 10¢; B, 9¢, net.

Galvanized.

Nos. 14 to 16	₩ lb. 3.24¢
Nos. 18 to 20	₩ lb. 3.51¢
Nos. 22 to 24	₩ lb. 3.78¢
No. 26	₩ lb. 4.05¢
No. 27	₩ lb. 4.32¢
No. 28	₩ lb. 4.59¢
No. 30	₩ lb. 5.04¢

No. 20 and lighter, 36 inches wide, 25¢ higher.

Foreign Steel from Store—

Best Cast	₩ lb. 15 ¢
Extra Cast	₩ lb. 18 @ 20 ¢
Swaged, Cast	₩ lb. 16 ¢
Best Double Shear	₩ lb. 15 ¢
Blister, 1st quality	₩ lb. 13 ¢
German Steel, Best	₩ lb. 10 ¢
2d quality	₩ lb. 9 ¢
3d quality	₩ lb. 8 ¢
Sheet Cast Steel, 1st quality	₩ lb. 15 ¢
2d quality	₩ lb. 14 ¢
3d quality	₩ lb. 12 ¢
J. Mushet's "Special"	₩ lb. 46 ¢
" "Titanic"	₩ lb. 19 ¢
Robson's Choice XX Extra Best	₩ lb. 35 ¢
Jessop Self Hardening	₩ lb. 45 ¢
Seamans' "Nelson" Steel	40 ¢
Hobson's "Soho" Special Self-Hardening	₩ lb. 43 ¢

METALS—

Tin—

Duty.—Pigs, Bars and Block. Free.	Per lb
Banca, Pigs	29¼@29¾¢
Straits, Pigs	29¼@29¾¢
Straits in Bars	29¾@30¼¢

Tin Plates—

American Charcoal Plates.

Galland Grade:	
IC, 14 x 20	$6.75
IX, 14 x 20	8.25
Melyn Grade:	
IC, 14 x 20	6.50
IX, 14 x 20	7.75
Allaway Grade:	
IC, 14 x 20	5.50
IX, 14 x 20	6.60

American Coke Plates—Bessemer—

IC, 14 x 20	108 lb.	$4.70@4.80
IX, 14 x 20		5.00@5.25

American Terne Plates—

IC, 20 x 28	$9.50
IX, 20 x 28	$11.50

Copper—

Duty: Pig, Bar and Ingot and Old Copper free. Manufactured, 3½¢ ₩ lb.

Ingot—

Lake	15¼¢
Casting	15 ¢

Sheet and Bolt—

March 12, 1903. Net.

Prices, in cents per pound. Sheet 30 x 60.

Not wider than	Not longer than	And longer than	64 oz. & over, 60 lb. sheet, 30 x 60 and heavier.	36 oz. to 64 oz. 25 to 30 lb.	24 oz. to 36 oz. 18¾ to 25 lb.	16 oz. to 24 oz. 12½ to 18¾ lb.	14 oz. and 15 oz. 11 to 12½ lb.	12 oz. and 13 oz. 9½ to 11 lb.	10 oz. and 11 oz. 7¾ to 9½ lb.	8 oz. and 9 oz. 6¼ to 7¾ lb.	Lighter than 8 oz.
Ins.	Ins.	Ins.									
30	72	.....	20	21	21	21	22	23	24	27	30
30	96	72	20	21	21	21	22	24	27	30	
30	.....	96	20	21	21	21	23	27			
36	72	.....	20	21	21	21	23	25	26	31	
36	96	72	20	21	21	21	23	27	30		
36	120	96	20	21	21	22	24				
36	.....	120	20	21	20	23					
48	72	.....	20	21	20	23	25	28	31		
48	96	72	20	21	20	24	26	29			
48	120	96	20	21	23	25	29				
48	.....	120	20	22	24	27					
60	72	.....	20	21	22	24	27	32			
60	96	72	20	21	23	25	30				
60	120	96	20	22	24	27					
60	.....	12	21	23	25	29					
72	96	.....	20	21	24	29					
72	120	96	20	23	26	31					
72	.....	120	21	24	29						
108	96	.....	21	24	27						
108	120	96	22	25	28						
108	.....	120	23	26	30						
wider than 108	132	.....	24	27							
	.....	132	25	28							

Rolled Round Copper, ¾ inch diameter and over, ₩ lb. 20¢.

Circles, Segments and Pattern Sheets, 3¢ ₩ lb. advance over price of sheet Copper required to cut them from.

Cold or Hard Rolled Copper 14 oz. ₩ square foot and heavier, 1¢ ₩ lb. over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 oz. ₩ square foot, 2¢ ₩ lb. over the foregoing prices.

All Polished Copper, 20 in. wide and under, 1¢ ₩ lb. advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 in. wide, 2¢ ₩ lb. advance over the price for Cold Rolled Copper.

Planished Copper—

1¢ ₩ lb. more than Polished Copper.

Copper Bottoms, Pits and Flats—

14 oz. to square foot and heavier, ₩ lb.	25¢
12 oz. and up to 14 oz. to square foot, ₩ lb.	26¢
10 oz. and up to 12 oz., ₩ lb.	27¢
Lighter than 10 oz., ₩ lb.	28¢

Circles less than 8 in. diameter, 2¢ ₩ lb. additional

Circles over 13 in. diameter are not classed as Copper Bottoms.

Polished Copper Bottoms and Flats, 1¢ ₩ lb. extra.

Copper Wire—

Hard and Soft Drawn—B. & S. Gauge.

List Feb. 25, 1901.

Nos. 0000 to 8	9 and 10	11 and 12	
Base	½¢	¾¢ ₩ lb. adv.	
Nos. 13	14	15	16
½¢	¾¢	1¢	1¼¢ ₩ lb. adv.
Nos. 17	18	19	20
1¼¢	2¢	2¼¢	2¾¢ ₩ lb. adv.

Seamless Brass Tubes—

Standard always Stubs' gauge, unless otherwise ordered.

Feb. 6, 1899. Net. Outside Diameter.

Stubs' W.G.	B. & S. W.G.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1⅛	1¼
4-11	3- 9	.....	.....	.....	.....	33	31	30	29	28	27	25	24
12	10	.....	.....	37	35	33	31	30	29	28	27	25	24
13	11	.....	.....	37	35	33	31	30	29	28	27	25	24
14	12	...	41	37	35	33	31	30	29	28	27	25	24
15	13	...	42	38	36	33	32	31	30	29	28	26	25
16	14	...	43	39	37	34	33	32	31	30	29	26	25
17	15	...	44	41	39	35	34	33	32	31	30	27	26
18	16	51	45	42	39	36	35	34	33	32	31	28	27
19	17	50	47	43	40	37	36	35	34	33	32	30	29
20	18-19	54	49	44	42	39	38	37	36	35	34	32	31
21	20	56	51	46	43	41	40	39	38	37	36	35	34
22	21	71	56	48	44	42	41	40	39	38	37	37	36
23	22	76	61	50	46	44	43	42	41	40	39	39	39
24	23	81	66	53	48	46	45	44	43	42	40	40	41
25	24	86	71	56	51	49	47	46	45	43	43	44	45

Copper Bronze and Gilding Tube, 3¢ ₩ lb. additional

Iron Pipe Sizes—Brass

⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6 inch
30	30	29	27	21	21	21	21	21	21	21	20	23	25	27	29½¢ ₩ lb.

Copper, Bronze or Gilding Tubes, 3¢ ₩ lb. additional

Brazed Brass Tubing.

(*To No. 19, inclusive.*) June 6, 1898.

Brown & Sharpe's gauge standard.

	Per lb.
Plain Round Tube, ¾ in. up to 2 in.	$0.35
" " ⅝ " ⅞ "	.36
" " ½ " ¾ "	.38
" " ⅜ " ½ "	.41
" " 5-16 " ⅜ "	.48
" " ¼ " 5-16"	.65
" " 3-16 " ¼ "	1.00
" " ⅛ " 3-16"	1.50
Smaller than ⅛ inch	Special
¾ inch to 3 inch, to No. 19, inclusive	.38
3 inch	.40
Over 3 inch to 3½ inch, inclusive	.45
Over 3½ inch	.50

Bronze and Copper, advance on Brass List, 3 cents.

Discount from list 5

Roll and Sheet Brass—

(*Brown & Sharpe Standard Gauge.*)

Common High Brass. Wider than and including	in. 2 12	in. 12 14	in. 14 16	in. 16 18	in. 18 20	in. 20 22	in. 22 24	in. 24 26
To No. 20 inclusive	.22	.23	.25	.27	.29	.31	.33	.36
Nos. 21 22, 23 and 24	.22	.24	.26	.28	.30	.32	.34	.37
Nos. 25 and 26	.23	.24½	.27	.29	.31	.33	.35	.38
Nos. 27 and 28	.23	.25	.28	.30	.32	.34	.35	.39

Common High Brass. Wider than and including	in. 26 28	in. 28 30	in. 30 32	in. 32 34	in. 34 36	in. 36 38	in. 38 40	in. 40
To No. 20, inclusive	.39	.42	.46	.50	.55	.60	.65	*
Nos. 21, 22, 23 and 24	.40	.43	.47	.51	.56	.61	.68	
Nos. 25 and 26	.41	.44	.48	.52	.57	.63	.71	
Nos. 27 and 28	.42	.45	.49	.53	.58	.65	.75	

* Special prices not less than 80 cents.

Add ½¢ ₩ lb. additional for each number thinner than Nos. 28 to 38 inclusive. Discount from List 25%

Wire in Coils. List February 26, 1900.

Brown & Sharpe's gauge the standard.	Cop'r, high brass.	Low brass.	Gild'g bronze and copper
All Nos. to No. 10, inclusive	$0.23	$0.27	$0.28
Above No. 10 to No. 16	.23½	.27½	.28½
No. 17 and No. 18	.24	.28	.32
No. 19 and No. 20	.25	.29	.33
No. 21	.26	.30	.34
No. 22	.27	.31	.35
No. 23	.28	.32	.36
No. 24	.30	.34	.38
No. 25	.32	.36	.40
No. 26	.35	.39	.43
No. 27	.38	.42	.46
No. 28	.42	.46	.51
No. 29	.45	.49	.54
No. 30	.48	.52	.62
No. 31	.51	.55	.67
No. 32	.55	.59	.73
No. 33	.59	.63	.82
No. 34	.64	.68	.95
No. 35	.70	.74	1.30
No. 36	.76	.80	1.50
No. 37	1.00	1.04	1.70
No. 38	1.30	1.34	2.00
No. 39	2.00	2.00	3.25
No. 40	2.60	2.60	5.75

Discount, Brass Wire, 25%; Copper Wire, Net. List November 16, '98.

Spring Wire, 2¢ ₩ lb. advance.

Tobin Bronze—

Straight, but not turned, Rods, ⅝ to 3 in. diameter, ₩ lb., net	19¢
Finished Piston Rods, ⅝ to 2½ in. diameter, ₩ lb. net,	20¢

Other sizes and extreme lengths, special prices.

Spelter—

Duty: In Blocks or Pigs, 1¢ ₩ lb.

Western Spelter	6¼@6¼¢

Zinc.

Duty: Sheet, 2¢ ₩ lb.

No. 9, base, casks	7¼¢
Open, per lb	8¢

Lead.

Duty: Pigs and Bars and Old, 2½¢ ₩ lb. Pipe and Sheets, 2½¢ ₩ lb.

American Pig	4½@4¾¢
Bar	5@5¼¢
Pipe	6¼@6½¢
Tin Lined Pipe	12½¢
Block Tin Pipe	20% off
Sheet Lead	40¢ net
Old Lead in exchange, 3½¢ ₩ lb.	6@6¼¢

Solder.

½ & ½ guaranteed	19 @19½¢
No. 1	16½@18 ¢

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Duty, ¾¢ ₩ lb.

Cookson	₩ lb. 8 @8½¢
Hallett's	₩ lb. 7¼@7½¢
U. S.	₩ lb. 7 @7¼¢

Aluminum—

Duty: Crude, 8¢ ₩ lb. Plates, Sheets, Bars and Rods, 13¢ ₩ lb.

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting:	
Small lots	₩ lb. 37¢
100-lb lots	₩ lb. 35¢
No. 2 Aluminum (guaranteed to be over 90% pure), in ingots for remelting:	
Small lots	₩ lb. 34¢
100-lb lots	₩ lb. 31¢
Aluminum Sheet, B. & S. gauge. 50 lb or more	

Wider than	6-in.	14-in.	24-in.
And including	14-in.	24-in.	30-in.
	₩ lb.	₩ lb.	₩ lb.
Nos. 13 to 19	$0.42	$0.44	$0.47
No. 20	.44	.46	.49
Nos. 21 to 23	.46	.48	.51
No. 24	.46	.50	.53
No. 25	.47	.51	.54
No. 26	.47	.54	.57
No. 27	.48	.57	.62
No. 28	.48	.57	.64
No. 29	.49	.60	.66
No. 30	.50	.64	.77

Note.—Lots of less than 50 lb 5¢ ₩ lb extra.

Aluminum Wire, B. & S. Gauge.

Larger than No. 9	₩ lb. 40¢	No. 15	₩ lb. 43¢
No. 9 to No. 10	₩ lb. 40½¢	No. 17	₩ lb. 50¢
No. 11	₩ lb. 41 ¢	No. 18	₩ lb. 55¢
No. 12	₩ lb. 41½¢	No. 19	₩ lb. 60¢
No. 13	₩ lb. 42 ¢	No. 20	₩ lb. 65¢
No. 14	₩ lb. 42½¢	No. 21	₩ lb. 85¢

Old Metals.

Dealers' Purchasing Prices Paid in New York.

Heavy Copper	₩ lb 11 ¢
Light and Tinned Copper	₩ lb 10½¢
Heavy Brass	₩ lb 8 ¢
Light Brass	₩ lb 6 ¢
Lead	₩ lb 3½¢
Tea Lead	₩ lb 3½¢
Zinc	₩ lb 4 ¢
No. 1 Pewter	₩ lb 18½¢
No. 2 Pewter	₩ lb 8½¢
Pure Aluminum, Sheet	₩ lb 21¢
Cast Aluminum	₩ lb 16¢
Tin Plate Scrap	₩ ton $4.50@5.00
Wrought Scrap Iron	₩ gross ton $14.00@14.50
Heavy Cast Scrap	₩ gross ton $14.00@14.50
Stove Plate Scrap	₩ gross ton $8.00@
Burnt Iron	₩ gross ton $7.50@

VOLUME

TIGHTLY BOUND

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